SOIL SURVEY OF

Marion County, South Carolina

United States Department of Agriculture
Soil Conservation Service

In cooperation with

South Carolina Agricultural Experiment Station and
South Carolina Land Resources Conservation Commission

How To Use This Soil Survey

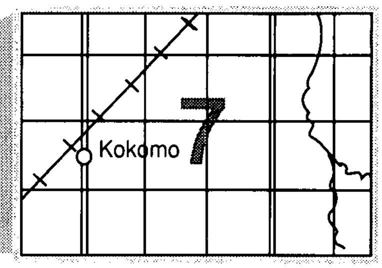
General Soil Map

The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

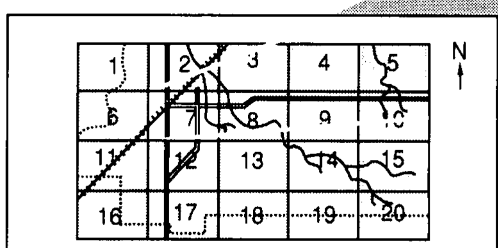
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.



MAP SHEET

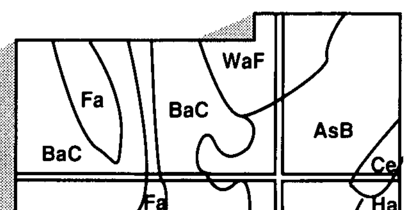
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.

MAP SHEET



AREA OF INTEREST

NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and agencies of the States, usually the Agricultural Experiment Stations. In some surveys, other Federal and local agencies also contribute. The Soil Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1969-74. Soil names and descriptions were approved in 1974. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1974. This survey was made cooperatively by the Soil Conservation Service, the South Carolina Agricultural Experiment Station, and the South Carolina Land Resources Conservation Commission. It is part of the technical assistance furnished to the Marion Soil and Water Conservation District.

Soil maps in this survey may be copied without permission, but any enlargement of these maps could cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.

Cover picture: Strips of small grain protect young tobacco plants from soil blowing on Dothan loamy fine sand, 0 to 2 percent slopes.

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Issued July 1980

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Foreword

The Soil Survey of Marion County, South Carolina contains much information useful in any land-planning program. Of prime importance are the predictions of soil behavior for selected land uses. Also highlighted are limitations or hazards to land uses that are inherent in the soil, improvements needed to overcome these limitations, and the impact that selected land uses will have on the environment.

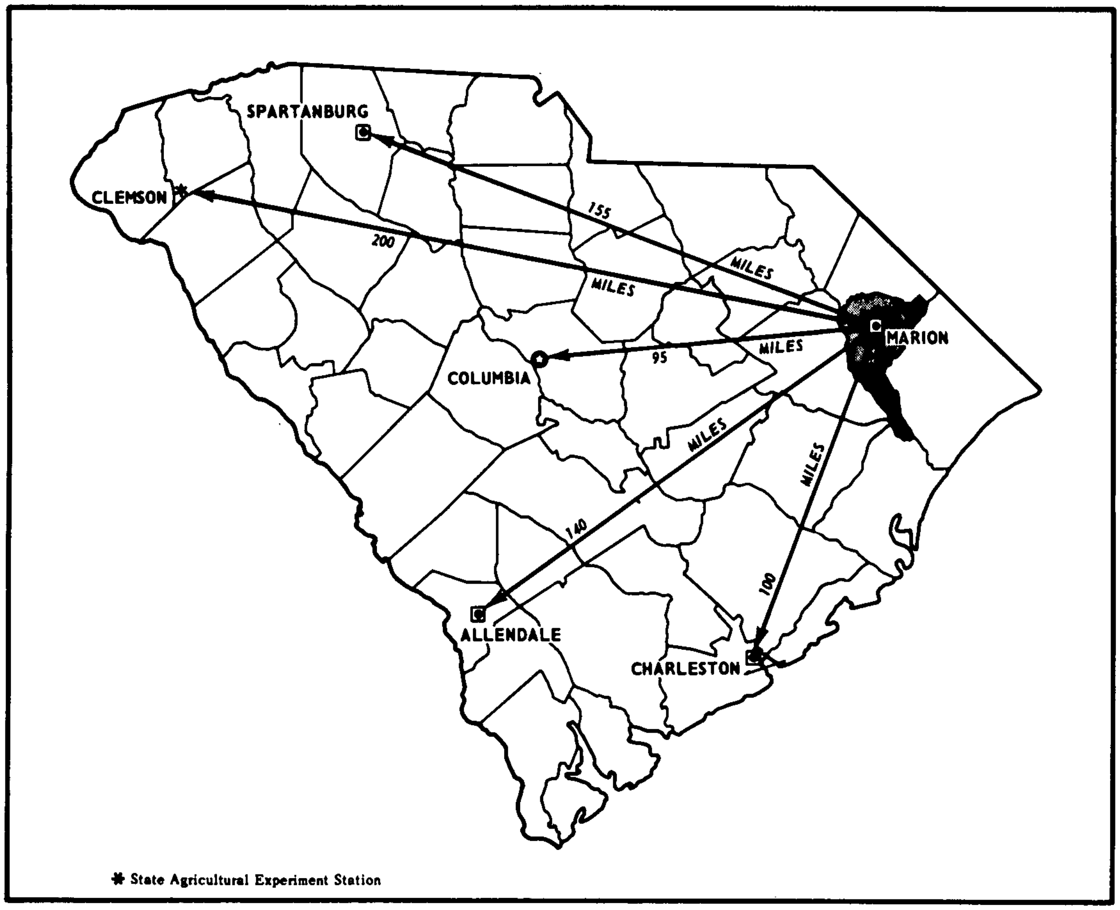
This soil survey has been prepared for many different users. Farmers, foresters, and agronomists can use it to determine the potential of the soil and the management practices required for food and fiber production. Planners, community officials, engineers, developers, builders, and homebuyers can use it to plan land use, select sites for construction, develop soil resources, or identify any special practices that may be needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the soil survey to help them understand, protect, and enhance the environment.

Many people assume that soils are all more or less alike. They are unaware that great differences in soil properties can occur even within short distances. Soils may be seasonally wet or subject to flooding. They may be shallow to bedrock. They may be too unstable to be used as a foundation for buildings or roads. Very clayey or wet soils are poorly suited to septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map; the location of each kind of soil is shown on detailed soil maps. Each kind of soil in the survey area is described, and much information is given about each soil for specific uses. Additional information or assistance in using this publication can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

We believe that this soil survey can help bring us a better environment and a better life. Its widespread use can greatly assist us in the conservation, development, and productive use of our soil, water, and other resources.

George E. Huey
State Conservationist
Soil Conservation Service



Location of Marion County in South Carolina.

SOIL SURVEY OF MARION COUNTY, SOUTH CAROLINA

By James J. Pitts, Soil Conservation Service

Soils surveyed by James J. Pitts, Travis A. Dudley, and Benjamin N. Stuckey, Jr., Soil Conservation Service

E. E. Herren and C. J. Mitchell, Jr., Soil Conservation Service, and R. O. Richardson, South Carolina Land Resources Conservation Commission, assisted with the fieldwork

United States Department of Agriculture, Soil Conservation Service, in cooperation with the South Carolina Agricultural Experiment Station and the South Carolina Land Resources Conservation Commission

MARION COUNTY is in the east-central part of South Carolina on the Atlantic Coastal Plain. It occupies 307,000 acres, or about 480 square miles. Marion, the county seat, is the largest town in the county.

Marion County originally included all of the present Marion and Dillon Counties and part of Florence County. It was created in 1785 as Liberty County and was called Liberty until 1798 when its name was changed to Marion. With the formation of Florence County to the west in 1888, Marion County lost some of its territory. It was further reduced to its present boundaries with the formation of Dillon County in 1910. The county and county seat were named for General Francis Marion, the "Swamp Fox" of Revolutionary War fame.

Most of the county consists of broad, nearly level to gentle slopes. The soils on flood plains of the rivers and smaller streams are subject to frequent flooding. The major soils series in the county are Cantey, Lakeland, Smithboro, Coxville, Dothan, Rutlege, Persanti, and Fuquay. The surface layer of these soils is dominantly loamy or sandy. Seventy-five percent of the soils in Marion County have excess water in the profile. Much of this land has been artificially drained with ditches and tile.

About 22 percent of the county is used for cultivated crops; 1 percent for pasture; 72 percent for woodland; and 5 percent for urban and other uses. The principal crops grown are tobacco, soybeans, corn, and cotton. Forest products are an important source of income.

How this survey was made

Soil scientists made this survey to learn what kinds of soil are in Marion County, where they are located, and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed the steepness, length, and shape of slopes; the size and speed of streams; the kinds of native plants or crops; the kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared those profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or geographic feature near the place where a soil of that series was first observed and mapped. Cantey and Dothan, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Dothan loamy fine sand, 0 to 2 percent slopes, is one of two phases within the Dothan series in Marion County.

After a guide for classifying and naming the soils was worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly

equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Marion County: soil associations and undifferentiated groups.

A soil association is made up of adjacent soils that occur as areas large enough to be shown individually on the soil map but are shown as one unit because the time and effort of delineating them separately cannot be justified. There is a considerable degree of uniformity in pattern and relative extent of the dominant soils, but the soils may differ greatly one from another. The name of an association consists of the names of the dominant soils, joined by a hyphen. Tawcaw-Chastain association is an example.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. If there are two or more dominant series represented in the group, the name of the group consists of the names of the dominant soils joined by "and." If a large part of a mapping unit is one series and other series are inclusions, only one series is used in the name. Ponzer soils is an example.

In most areas surveyed there are places where the soil material is so rocky, so shallow, so severely eroded, or so variable that it has not been classified by soil series. These places are shown on the soil map and are described in the survey, but they are called miscellaneous areas and are given descriptive names. Borrow pits is an example.

While a soil survey is in progress, soil scientists take soil samples needed for laboratory measurements and for engineering tests. Laboratory data from the same kind of soil in other places are also assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kind of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others, then adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General soil map for broad land use planning

The soil map for broad land use planning at the back of this survey shows, in color, the soil associations in the survey area. A soil association is a landscape that has a distinctive pattern of soils in defined proportions. It typically consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in an association can occur in other associations, but in different patterns.

A map showing soil associations is useful to people who want to have a general idea of the soils in a survey area, who want to compare different parts of that area, or who want to find suitable sites for a certain kind of land use. Such a map is a useful general guide for broad planning of a watershed, a wooded tract, or a wildlife area or for broad planning of recreation facilities, community developments, and engineering works. It is not a suitable map for detailed planning for management of a farm or field or for selecting a site for a road or building or other structure, because the soils within an association ordinarily vary in slope, depth, stoniness, drainage, and other characteristics that affect their management.

The soil associations in this survey area have been grouped into general kinds of landscapes for broad interpretive purposes. Each of the broad groups and the soil associations in it are described on the following pages.

Nearly level to sloping soils on ridges and the upper part of slopes

These soil associations form broad stream divides and are made up of dominantly well-drained soils. Slopes generally are long and smooth, but a few are short with sharp breaks, and a few are hummocky. Branching drains are throughout these associations except in areas of soils that are dominantly sandy throughout. Most of these soils have a sandy surface layer and a subsoil with brown colors.

1. Lakeland-Rutlege association

Excessively drained and very poorly drained soils that are sandy throughout

This association consists of nearly level to gently sloping, excessively drained sandy soils on long narrow ridges and nearly level very poorly drained sandy soils in slightly depressed areas and drainageways. It occurs mainly in the western and southern parts of the county adjacent to the flood plains of the Great Pee Dee River. This association occupies about 13 percent of the county.

Lakeland soils make up about 50 percent of this association; Rutlege soils, about 20 percent; and minor soils, the remaining 30 percent.

Lakeland soils are excessively drained and have a dark brown sand surface layer underlain by yellowish brown sand. They occupy the highest positions in the association. Rutlege soils are very poorly drained and have a thick black loamy sand surface layer underlain by grayish sand. They occur in the low wet areas of the association.

Minor soils in this association are in the Kenansville, Centenary, Foreston, Eunola, Lumbee, Osier, Leon, Lynn Haven, and Paxville series. Kenansville soils are well drained and occur at the highest elevations along with Lakeland soils. Centenary, Foreston, and Eunola soils are moderately well drained and occur in the intermediate drainage positions. The poorly drained Lumbee, Osier, Leon, and Lynn Haven soils and the very poorly drained Paxville soils occur at the lowest elevations along with Rutlege soils.

About 20 percent of this association is in crops or pasture. The remainder is in woodland. Much of this land has been planted to pines in recent years. About 25 percent of this association is owned by forest industries. The remainder is in small general-type farms that are farmer-owned. The main crops are corn, soybeans, tobacco, cotton, hay, and pasture grasses. The Lakeland soils are not well suited to cultivated crops because they are droughty. Most of the Rutlege soils are in woodland. They are not well suited to cultivated crops. They are better suited for woodland production or permanent pasture. Suitability for pines is moderate to high on the soils of this association.

Some of the better drained soils of this association are suited to management for quail. Cover is ample, but food is limited. Strips of bicolor lespedeza planted on the well drained soils can furnish choice food for wildlife, especially late in winter and early in spring.

2. Dothan-Coxville association

Well drained soils that have a sandy surface layer and a loamy subsoil and poorly drained soils that have a loamy surface layer and a clayey subsoil

This association consists of broad ridges of nearly level to gently sloping, well drained soils and broad flat areas and depressions at lower elevations occupied by poorly drained soils. It is dissected by many small streams and drains. Depressed areas are about midway between the drains. The ridges have narrow, sloping sides parallel to the flood plains of the small streams. Areas of poorly drained to very poorly drained soils along the small streams vary in width from a few hundred feet to about one-fourth of a mile. This association is in the north-central and northeastern parts of the county. It occupies about 22 percent of the county.

Dothan soils make up about 22 percent of this association; Coxville soils, about 20 percent; and minor soils, the remaining 58 percent.

The well drained Dothan soils are at the higher elevations on broad ridges. They have a grayish brown loamy fine sand surface layer and a yellowish brown sandy clay loam subsoil which contains more than 5 percent nodules of plinthite in the lower part. Coxville soils are poorly drained and occur in low flat areas and depressions. They commonly have a very dark gray fine sandy loam surface layer and a gray clay subsoil with yellowish brown and red mottles.

Minor soils in this association are in the Summerton, Varina, Fuquay, Brogdon, Goldsboro, Duplin, Persanti, Dunbar, Smithboro, Lynchburg, Rains, Pantego, Johnston, and Rutlege series. Summerton, Varina, Fuquay, and Brogdon soils are well drained and occur in the same drainage position as Dothan soils. The moderately well drained Goldsboro, Duplin, and Persanti soils and the somewhat poorly drained Dunbar, Smithboro, and Lynchburg soils occur in the intermediate drainage positions. The poorly drained Rains soils and the very poorly drained Pantego soils occur at about the same elevations as the Coxville soils. The Johnston and Rutlege soils are very poorly drained and occur along the small streams, at the lowest elevations.

The towns of Marion and Mullins are in this association. About 50 percent of this association is in cropland or pasture. The remainder is in woodland or is used for nonfarm purposes. Farms are small to medium in size, and are mainly owner-operated. The principal crops are tobacco, cotton, corn, soybeans, and small grains. Most of the soils of this association are well suited to row crops. The soils that are not well drained require simple to intensive drainage practices for maximum production. Suitability for pines is high on the soils of this association.

The soils of this association are suited to development for quail and other small game. Cover is adequate and there is a moderate amount of natural food. Artificial drainage may be necessary on some soils to establish perennial foods, such as bicolor lespedeza for quail. There are some pond sites available where combination fishing, swimming, and boating facilities can be developed. Excavated ponds that are a source of irrigation water are numerous. Some of these are suitable for fishing if managed properly (fig. 1).

3. Fuquay-Blanton-Foreston association

Well drained and moderately well drained soils that have a sandy surface layer and a loamy subsoil

This association consists of mostly nearly level to gently sloping, well drained soils on broad ridges and nearly level, moderately well drained soils at slightly lower elevations. It is located mainly in the north-central part of the county and occupies about 9 percent of the county.

Fuquay soils make up about 25 percent of this association; Blanton soils, about 18 percent; Foreston soils, about 15 percent; and minor soils, the remaining 42 percent.

Fuquay and Blanton soils are well drained and slightly droughty and occupy the highest positions in the association. Fuquay soils have a sand surface layer and subsurface layer which, together, are about 28 inches thick and a yellowish brown sandy clay loam subsoil which contains

more than 5 percent nodules of plinthite. Blanton soils are sandy to a depth of about 60 inches. Below this is sandy loam grading to sandy clay loam mottled with shades of yellow, brown, gray, and red. Foreston soils are moderately well drained and occur in the intermediate drainage positions. They commonly have a very dark grayish brown loamy sand surface layer and a sandy loam subsoil that is yellowish brown in the upper part and very pale brown with light gray mottles in the lower part. Beneath this is very pale brown and light gray loamy sand with pockets of clean sand grains.

Minor soils in this association are in the Lakeland, Pocalla, Brogdon, Centenary, Goldsboro, Rains, Coxville, Leon, Lynn Haven, Pantego, and Rutlege series. The excessively drained Lakeland soils and well drained Pocalla and Brogdon soils occur in the same drainage position as Fuquay and Blanton soils. Centenary and Goldsboro soils are moderately well drained and occur in the same drainage position as Foreston soils. The poorly drained Rains, Coxville, Leon, and Lynn Haven soils and the very poorly drained Pantego and Rutlege soils occur at the lowest elevations: on broad, flat areas, in oval-shaped depressions, and along small streams and drainageways.

About 40 percent of this association is in cropland or pasture. The remainder is in woodland. Some of this land has been planted to pines in recent years. Most of the farms are small to medium in size and are mainly owner-operated. The principal crops are tobacco, cotton, corn, soybeans, and small grains. Most of the soils of this association are suited to row crops. Most are moderately to well suited to pines.

The soils of this association are suited to development for quail and other small game. A few sites are suitable for fishponds.

Dominantly nearly level soils on the lower part of slopes and on flats

These soil associations occupy broad low flats and low-lying areas. Most soils have restricted drainage. Slopes are dominantly less than 1 percent. Drainage patterns are poorly defined, and some areas are ponded. These soils generally have a loamy or sandy surface layer and a subsoil dominated by or containing grayish brown to gray colors.

4. Smithboro-Persanti-Cantey association

Moderately well drained to poorly drained soils that have a loamy surface layer and a clayey subsoil

This association consists of broad areas of dominantly nearly level soils in western and southern parts of the county. The soils formed on the river terraces in old alluvium of clays and silty clays. The association occupies about 14 percent of the county.

Smithboro soils make up about 30 percent of the association; Persanti soils, about 20 percent; Cantey soils about 20 percent; and minor soils, the remaining 30 percent.

Smithboro soils are somewhat poorly drained and occur in intermediate drainage positions between Persanti and Cantey soils. They have a dark grayish brown silt loam surface layer and a clay loam subsoil that is mottled in shades of gray, yellow, brown, and red. Persanti soils are moderately well drained and occur at slightly higher elevations. These soils commonly have a dark gray fine sandy loam surface layer and a yellowish brown clay subsoil mottled in shades of brown, red, and gray. The poorly drained Cantey soils occur in the depressions and at lower elevations. They have a very dark gray loam surface layer and a gray clay subsoil mottled with yellowish brown, strong brown, and red.

Minor soils in this association are in the Summerton, Cahaba, Hiwassee, Eunola, and Lumbee series. Summerton, Cahaba, and Hiwassee soils are well drained and occupy the highest positions in the association. Eunola soils are moderately well drained and occur in the same drainage positions as Persanti soils. Lumbee soils are poorly drained and occur at lower elevations along with Cantey soils.

About 30 percent of this association is in cropland or pasture. The remainder is in woodland. Most of the farms are small to medium in size and are farmer-owned and operated. The principal crops are tobacco, corn, soybeans, cotton, and small grain. Smithboro and Persanti soils are suited to the principal crops if adequately drained. Cantey soils are better suited to woodland or pasture. This association is well suited to pines.

The soils of this association are suited to development for quail and other small game. Cover is abundant, and there is a moderate amount of natural food.

5. Cantey-Byars-Smithboro association

Very poorly drained to somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil

This association is in broad, low, flat areas in western and southern parts of the county. The soils formed on the river terraces in thick deposits of clay and silty clay. The association occupies about 14 percent of the county.

Cantey soils make up about 65 percent of this association; Byars soils, about 17 percent; Smithboro soils, about 10 percent; and minor soils, the remaining 8 percent.

The poorly drained Cantey soils have a very dark gray loam surface layer and a gray clay subsoil mottled with yellowish brown, strong brown, and red. The Byars soils are very poorly drained. They have a black loam surface layer and a mottled dark gray clay subsoil. The Smithboro soils are somewhat poorly drained and occur at slightly higher elevations. They have a dark grayish brown silt loam surface layer and a clay loam subsoil that is mottled in shades of gray, yellow, brown, and red.

Minor soils in this association are in the Persanti, Lumbee, and Paxville series. Persanti soils are moderately well drained and occupy the highest positions in the association. The poorly drained Lumbee soils and very poorly drained Paxville soils occur at the lower elevations along with Cantey and Byars soils.

Most of this association is in woodland. A few thousand acres are planted to corn and soybeans. Much of the woodland is in large tracts owned by forest industries. The main source of income is forest products. The soils of this association require intensive management to control wetness if used for cultivated crops. Some areas are subject to frequent flooding. The soils are well suited to pines and bottom-land hardwoods.

Large tracts of woodland provide favorable habitat for deer. Some sites could be developed for duck fields.

6. Pantego-Rutlege-Coxville association

Very poorly drained soils that are loamy or sandy throughout and poorly drained soils that have a loamy surface layer and a clayey subsoil

This association consists of large oval-shaped bays or depressions in the north-central part of the county. It occupies about 3 percent of the county.

Pantego soils make up about 40 percent of this association; Rutlege soils, about 20 percent; Coxville soils, about 15 percent; and minor soils, the remaining 25 percent.

Pantego and Rutlege soils are very poorly drained. Pantego soils have a thick black loam surface layer and a dark gray and gray sandy clay loam subsoil. Rutlege soils have a thick black loamy sand surface layer underlain by grayish sand. The poorly drained Coxville soils commonly have a very dark gray fine sandy loam surface layer and a gray clay subsoil with yellowish brown and red mottles.

Minor soils in this association are in the Paxville, Ponzer, Rains, Lynn Haven, Osier, Rimini, and Centenary series. The very poorly drained Paxville and Ponzer soils and the poorly drained Rains, Lynn Haven, and Osier soils occur with the Pantego, Rutlege, and Coxville soils in the bays or depressions. The Rimini soils are excessively drained and occur on the rim of the oval-shaped bays or depressions. The moderately well drained Centenary soils occur in intermediate drainage positions.

About 30 percent of this association has been cleared in recent years and is planted to corn and soybeans. The rest is in woodland. The soils of this association require intensive management to control wetness if used for cultivated crops. They are well suited to pines and bottomland hardwoods.

Some of the larger areas of woodland provide favorable habitat for deer.

Nearly level soils on flood plains

These soil associations are on medium to broad flood plains of large creeks and rivers. Most soils are poorly or very poorly drained. Drainage patterns are very poorly defined. These soils are frequently flooded, and some have water covering the surface most of the time. These soils have a loamy, sandy, or clayey surface layer and are dominated by gray colors below the surface layer.

7. Tawcaw-Chastain association

Somewhat poorly drained and poorly drained soils that have a clayey or loamy surface layer and a clayey subsoil

This association occupies the flood plains along the Great Pee Dee River. The topography is a series of low ridges and depressions that generally parallel the river. There are several oxbow lakes and old stream channels that are filled with water. The soils formed in recent alluvium washed from the Piedmont and Coastal Plains. They are flooded frequently. Many areas have standing water a few inches to several feet deep for several months during every year. This association occupies about 13 percent of the county.

Tawcaw-Chastain association, frequently flooded, makes up about 95 percent of this association. Minor soils make up the remaining 5 percent.

Tawcaw soils are somewhat poorly drained and occur on the low ridges. They have a dark yellowish brown silty clay surface layer and a mottled yellowish brown and gray clayey subsoil. Chastain soils are poorly drained and occupy the depressions and flats between the ridges. They have a brown clay surface layer and a dominantly gray, clayey subsoil.

Minor soils in this association are in the Byars, Cantey, and Lakeland series. The very poorly drained Byars soils and the poorly drained Cantey soils occur on low terraces, generally on the edge of the association away from the river. The excessively drained Lakeland soils occur on narrow ridges of high terraces scattered throughout the association.

All of this association is in woodland of mostly bottomland hardwoods. Some of the higher ridges are in pines. Most of the area is owned by forest industries. Woodland products are pulpwood, sawtimber, and veneer. The soils are well suited to bottom-land hardwoods and pines, but areas in pines require management to control wetness.

The soils in this association provide excellent habitat for deer. Sites suitable for woodland duck ponds are numerous, but flooding needs to be controlled. The river and lakes are used for boating and fishing.

8. Ponzer association

Very poorly drained soils that have a mucky surface layer and a loamy underlying layer

This association is on the flood plains along Catfish Canal and Catfish Creek. It is subject to occasional flooding, and occupies about 2 percent of the county.

Ponzer soils make up about 80 percent of the association, and minor soils, the remaining 20 percent.

Ponzer soils are very poorly drained. They have about 41 inches of black decomposed organic material overlying loamy mineral material.

The minor soils in this association are in the Byars, Johnston, Rutlege, and Cantey series. The very poorly drained Byars, Johnston, and Rutlege soils occur with the

Ponzer soils at about the same elevations. The poorly drained Cantey soils occur at slightly higher elevations.

Several hundred acres along Catfish Canal have been cleared and are being used for row crops and pasture. Principal crops are corn and soybeans. The rest of the association is in woodland, which consists mostly of bottom-land hardwoods. The soils of this association require intensive management to control excess water when they are used for cultivated crops. The soils are moderately to well suited to bottom-land hardwoods and pines, but wetness needs to be controlled in areas used for pines.

Large tracts of woodland provide favorable habitat for deer. The canals and creeks are used for fishing.

9. Johnston-Rutlege-Lakeland association

Very poorly drained soils that are dominantly loamy or sandy throughout and excessively drained soils that are sandy throughout

This association is on the flood plains and adjacent stream terraces along the Little Pee Dee and Lumber Rivers. There are several lakes that formed from old stream channels. The soils formed in sandy alluvium washed from the Coastal Plain. The lower areas are flooded frequently. Many areas have standing water a few inches to several feet deep during the winter and spring months. This association occupies about 10 percent of the county.

Johnston soils make up about 30 percent of this association; Rutlege soils, about 12 percent; Lakeland soils, about 10 percent; and minor soils, the remaining 48 percent.

Johnston and Rutlege soils are very poorly drained and occur in the lowest areas of the flood plains. Johnston soils have about 35 inches of black fine sandy loam underlain by dark gray fine sand. Rutlege soils have a thick black loamy sand surface layer underlain by grayish sand. Lakeland soils are excessively drained and occur on the higher ridges of terraces throughout the association. They have a dark brown sand surface layer underlain by yellowish brown sand.

Minor soils in this association are in the Centenary, Eunola, Lumbee, Lynn Haven, Leon, Osier, and Paxville series. The moderately well-drained Centenary and Eunola soils are in intermediate positions on the terraces. The poorly drained Lumbee, Lynn Haven, Leon, and Osier soils and the very poorly drained Paxville soils occur on the low terraces.

Most of this association is in woodland. The very poorly drained areas support mainly bottom-land hardwoods. The slightly higher areas of terrace soils are in pines. A large part of the association is owned by forest industries. The soils are moderately to well suited to bottom-land hardwoods and pines, but wetness needs to be controlled on the lower areas used for pines.

Large tracts of woodland in this association provide excellent habitat for deer. The Little Pee Dee River provides fishing, boating, and swimming. Vacation cabins are along the river. Several natural lakes also provide good fishing.

Descriptions of the soils

This section describes each soil series in detail and then, briefly, each mapping unit in that series. Unless stated otherwise, what is stated about the soil series holds true for the mapping units in that series. Thus, to get full information about any one mapping unit, it is necessary to read both the description of the mapping unit and the description of the soil series to which it belongs.

An important part of the description of each soil series is the soil profile, that is, the sequence of layers from the surface down to rock or other underlying material. The profile of each series is described twice. The first description is brief and in terms familiar to a layman. The second is more detailed and is for those who need to make thorough and precise studies of soils. The profile described is representative of mapping units in a series. If the profile of a given mapping unit is different from the one described for the series, the differences are apparent in the name of the mapping unit, or the differences are stated in describing the mapping unit. Color terms are for moist soil unless otherwise stated.

As mentioned in the section "How this survey was made," not all mapping units are members of a soil series. Borrow pits, for example, does not belong to a soil series. Nevertheless, it is listed in alphabetic order along with the soil series.

Preceding the name of each mapping unit is the symbol that identifies the mapping unit on the detailed soil map. Listed at the end of the description of each mapping unit is the capability unit and woodland group in which the mapping unit has been placed.

The acreage and proportionate extent of each mapping unit are shown in table 1. Many of the terms used in describing soils can be found in the Glossary, and more detailed information about the terminology and methods of soil mapping can be obtained from the Soil Survey Manual (7).

Blanton series

The soils of the Blanton series are nearly level to gently sloping and well drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is dark grayish brown sand about 9 inches thick. The subsurface layer is light yellowish brown and yellowish brown sand about 51 inches thick. The next layer extends to a depth of 80 inches or more. The upper 10 inches of this layer is mottled yellowish brown, light gray, and light yellowish brown, friable sandy loam; and the lower 10 inches is mottled yellowish brown, light gray, and yellowish red, friable sandy clay loam.

Blanton soils occur with Fuquay, Lakeland, Pocalla, and Brogdon soils. Blanton soils have a thicker surface horizon than Fuquay, Pocalla, and Brogdon soils. Blanton soils lack nodules of plinthite, which occur in Fuquay, Po-

calla, and Brogdon soils. Blanton soils have a Bt horizon, and Lakeland soils do not.

Blanton soils are low in organic matter. Permeability is rapid through the surface and subsurface horizons and moderate through the subsoil. Surface runoff is slow. Available water capacity is low.

Representative profile of Blanton sand about 1 1/4 miles east of Marion, 3/4 mile west of intersection of U.S. 76 and S.C. Secondary Road 19, in a nearly level, cultivated field 200 feet south of secondary road.

Ap—0 to 9 inches, dark grayish brown (10YR 4/2) sand; weak fine and medium granular structure; loose; common fine roots; medium acid (pH 5.8); abrupt smooth boundary.

A21—9 to 28 inches, light yellowish brown (10YR 6/4) sand; single grained; loose; few medium sized pockets of uncoated sand grains (10YR 6/3); strongly acid (pH 5.4); gradual wavy boundary.

A22—28 to 50 inches, yellowish brown (10YR 5/6) sand; single grained; loose; common medium pockets of uncoated sand grains (10YR 6/3); strongly acid (pH 5.1); gradual wavy boundary.

A23—50 to 60 inches, light yellowish brown (10YR 6/4) sand; few medium distinct yellowish brown (10YR 5/8) mottles; single grained; loose; common medium pockets of uncoated sand grains (10YR 6/3); strongly acid (pH 5.2); gradual smooth boundary.

B1—60 to 70 inches, mottled yellowish brown (10YR 5/6), light gray (10YR 6/1), and light yellowish brown (10YR 6/4) sandy loam; common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; few (less than 3 percent) coarse red brittle bodies; sand grains coated and bridged with clay; very strongly acid (pH 4.9); gradual smooth boundary.

B2t—70 to 80 inches, mottled yellowish brown (10YR 5/8), light gray (10YR 7/1), and yellowish red (5YR 5/6) sandy clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few (less than 3 percent) coarse red brittle bodies; thin patchy clay films on faces of peds; very strongly acid (pH 4.9).

The solum is more than 80 inches thick. The A horizon is medium acid through very strongly acid. The B horizon is strongly acid or very strongly acid.

The A horizon commonly is 40 to 72 inches thick. The A1 or Ap horizon is 6 to 10 inches thick and is dark grayish brown, very dark grayish brown, or brown. The A2 horizon is 32 to 62 inches thick and is pale brown, light yellowish brown, yellowish brown, strong brown, or brownish yellow sand or loamy sand.

The B1 horizon, where present, is 6 to 12 inches thick and is mottled in shades of yellow, brown, red, and gray. In some profiles the dominant color is yellowish brown or light yellowish brown.

The B2t horizon commonly extends to a depth greater than 80 inches. It is commonly mottled with shades of yellow, brown, gray, and red. In some profiles the upper 8 to 15 inches is yellowish brown, strong brown, light brownish yellow, or brownish yellow with few to common mottles in shades of yellow, brown, red, and gray. Texture of the B2t horizon is sandy loam or sandy clay loam. In some profiles the B2t horizon contains a few plinthite nodules.

BaB—Blanton sand, 0 to 6 percent slopes. This nearly level to gently sloping soil occurs on broad ridges.

Included with this soil in mapping are small areas of Lakeland, Fuquay, and Pocalla soils. A few areas have soils with more than 5 percent nodules of plinthite within 60 inches of the surface. Also included in a few slight depressions less than 4 acres in size, are wet soils which are shown on the map by wet spot symbols.

This soil is easily tilled over a wide range of moisture conditions.

About 65 percent of this soil is cropland or pasture. The rest is woodland. The principal crops are corn, soybeans, Coastal bermudagrass, bahiagrass, and sericea lespedeza. This soil is droughty. Wind erosion is a hazard on some of the larger cultivated fields.

Cropping systems that include wind stripcropping, cover crops, and crop residue management are essential for crop production. This soil leaches rapidly; lime and fertilizer should be applied frequently, but in smaller amounts. Capability unit IIIs-1; woodland group 3s2.

Borrow pits

Bp—Borrow pits. A miscellaneous area that has various slopes and consists of open pits from which sand or other soil material has been removed. These pits are 2 to 10 feet deep and 4 to 40 acres in size. Areas smaller than 4 acres are shown on the soil map by a pick and shovel symbol. Some of these pits contain water during rainy periods. A few shallow pits have been planted to pine trees. Capability unit VIIs-2; woodland group not classified.

Brogdon series

The soils of the Brogdon series are nearly level and well drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is dark grayish brown sand about 9 inches thick. The subsurface layer is pale brown sand about 8 inches thick. The next layer is yellowish brown friable sandy loam about 18 inches thick. Below this layer is 23 inches of yellowish brown sand mottled with yellowish red, pale brown, and light gray. The next layer is friable sandy loam and extends to a depth of more than 75 inches. The upper 7 inches is brownish yellow with pale brown and light gray mottles, and it contains 5 to 10 percent nodules of plinthite; the lower part is yellowish brown with light gray mottles.

Brogdon soils occur with Dothan, Goldsboro, Fuquay, and Pocalla soils. Brogdon soils are coarser textured in the upper part of the subsoil than Dothan and Goldsboro soils. Brogdon soils have a thinner surface layer than Fuquay and Pocalla soils.

Brogdon soils are low in organic matter. Permeability is moderate to moderately rapid. Surface runoff is slow to medium. Available water capacity is medium to low.

Representative profile of Brogdon sand, 0 to 2 percent slopes, about 2 miles northeast of Marion, 2,000 feet west of S.C. Highway 41A, in cultivated field 150 feet west of dirt road.

Ap—0 to 9 inches, dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; many fine roots; slightly acid (pH 6.2); abrupt smooth boundary.

A2—9 to 17 inches, pale brown (10YR 6/3) sand; single grained; loose; common fine roots; slightly acid (pH 6.3); clear smooth boundary.

B2t—17 to 35 inches, yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; few fine roots; many fine pores; few coarse red brittle bodies; few patchy clay films on faces of peds and in pores; sand grains coated and bridged with clay; strongly acid (pH 5.3); gradual wavy boundary.

A'2—35 to 58 inches, yellowish brown (10YR 5/6) sand; few medium distinct yellowish red (5YR 5/6), pale brown (10YR 6/3), and light gray (10YR 7/2) mottles; single grained; loose; medium acid (pH 5.7); gradual wavy boundary.

B'21t—58 to 65 inches, brownish yellow (10YR 6/6) sandy loam; common medium distinct pale brown (10YR 6/3) and light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable; many fine pores; common (5 to 10 percent) coarse red brittle bodies; patchy clay films on faces of peds and in pores; sand grains coated and bridged with clay; strongly acid (pH 5.4); gradual wavy boundary.

B'22t—65 to 75 inches, yellowish brown (10YR 5/6) sandy loam; common medium distinct light gray (10YR 7/1) mottles; weak medium subangular blocky structure; friable; few coarse red brittle bodies; patchy clay films on faces of peds; strongly acid (pH 5.4).

The solum is more than 65 inches thick. The A horizon is slightly acid to strongly acid and the B horizon is strongly acid or very strongly acid.

The A horizon is 12 to 19 inches thick. Thickness of the Ap horizon ranges from 7 to 9 inches. The A2 horizon is 5 to 12 inches thick and is pale brown, light yellowish brown, or yellowish brown sand or loamy sand.

The B2t horizon is yellowish brown or strong brown and is 10 to 24 inches thick. Some pedons contain 2 to 7 percent plinthite nodules.

The B3 horizon, where present, is loamy sand 4 to 14 inches thick. It is yellowish brown or brownish yellow and may have few to common pale brown or light gray mottles.

The A'2 horizon is sand or loamy sand 10 to 24 inches thick. It is yellowish brown, brownish yellow, pale brown, or very pale brown with light gray and pale brown mottles.

The B'2t horizon ranges in thickness from about 10 to more than 25 inches. It is sandy loam or sandy clay loam. There are more than 5 percent plinthite nodules in this horizon within 60 inches of the surface.

BrA—Brogdon sand, 0 to 2 percent slopes. This soil occurs on broad ridges.

Included with this soil in mapping are a few small areas of Pocalla, Fuquay, Dothan, and Goldsboro soils. There are a few small areas of moderately well drained soils that are bisequal. Some mapped areas of this soil include small depressed areas of poorly drained soils that are shown on the map by wet spot symbols. Also included are some areas of soils with less than 5 percent nodules of plinthite within 60 inches of the surface. There are a few areas included that have a loamy sand surface layer.

This soil is easily tilled over a wide range of moisture conditions.

Most of this soil is in row crops. The principal crops are cotton, corn, tobacco, and soybeans. This soil is slightly droughty during periods of low rainfall.

Large amounts of organic matter and fertilizer are needed to maintain yields, improve tilth, decrease the rate of leaching, improve water-holding capacity, and help control wind erosion. Winds early in spring cause soil blowing in exposed areas that are dry and freshly plowed. Stripcropping with small grain or planting permanent windbreaks are effective means of reducing the loss of soil and damage to crops. In places this soil forms a tillage pan which restricts root development and water movement. Chiseling is used to break such pans. Capability unit IIs-3; woodland group 2o1.

Byars series

The soils of the Byars series are nearly level and very poorly drained. They formed in stream deposits of clayey sediments.

In a typical profile the surface layer is black loam about 9 inches thick. The next layer is about 64 inches thick. In sequence from the top, it is 4 inches of black, firm clay loam; 8 inches of mottled dark gray, very firm clay; 22 inches of mottled gray, very firm clay; 22 inches of mottled dark gray and gray, very firm clay; and 8 inches of mottled dark gray and yellowish brown, very firm clay. The underlying material to a depth of about 79 inches is mottled gray clay.

Byars soils occur with Cantey, Smithboro, Persanti, and Ponzer soils. Byars soils are more poorly drained and have a thicker dark surface layer than Cantey, Smithboro, and Persanti soils. Byars soils lack the thick organic surface layer of the Ponzer soils.

Byars soils are high in organic matter. Permeability is slow. Surface runoff is very slow to ponded. Available water capacity is medium.

Representative profile of Byars loam about 2 miles northwest of Marion, 2 miles north of S.C.L. Railroad crossing over Catfish Canal, in cultivated field 200 feet north of bend in farm road and 650 feet west of Catfish Canal.

Ap—0 to 9 inches, black (10YR 2/1) loam; weak fine granular structure; friable; common fine roots; very strongly acid (pH 4.7); clear smooth boundary.

B1g—9 to 13 inches, black (10YR 2/1) clay loam; weak medium subangular blocky structure; firm; few fine roots; common fine pores; thin patchy clay films on faces of peds; extremely acid (pH 4.4); clear smooth boundary.

B21tg—13 to 21 inches, dark gray (10YR 4/1) clay; few fine distinct strong brown mottles along old root channels; moderate medium subangular blocky structure; very firm; few fine roots; common fine pores; thin continuous clay films on faces of peds; extremely acid (pH 4.4); gradual wavy boundary.

B22tg—21 to 43 inches, gray (10YR 5/1) clay; common fine distinct yellowish brown and strong brown mottles along old root channels; moderate fine subangular blocky structure; very firm; few fine pores; thin continuous clay films on faces of peds; extremely acid (pH 4.3); gradual wavy boundary.

B23tg—43 to 65 inches, mottled dark gray (10YR 4/1) and gray (10YR 5/1) clay; common fine and medium distinct yellowish brown (10YR 5/6) and strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; very firm; thin patchy clay films on faces of peds; extremely acid (pH 4.4); gradual wavy boundary.

B3g—65 to 73 inches, mottled dark gray (10YR 4/1) and yellowish brown (10YR 5/8) clay; weak medium subangular blocky structure; very firm and very sticky; extremely acid (pH 4.3); clear wavy boundary.

Cg—73 to 79 inches, gray (10YR 5/1) clay; few fine and medium distinct yellowish brown (10YR 5/6) mottles; massive; very firm and sticky; very strongly acid (pH 4.5).

The solum is more than 60 inches thick. These soils range from strongly acid to extremely acid throughout the profile.

The A horizon is 6 to 12 inches thick. It is black or very dark gray. When moist, the soil material in the upper 10 inches has color value of 3 or less.

The B1 horizon, where present, is 3 to 5 inches of clay loam or silty clay loam. It is black, very dark gray, dark gray, or gray.

The B2t horizon is more than 40 inches thick. It is clay loam, silty clay loam, silty clay, or clay. The top 20 inches is more than 35 percent clay and more than 30 percent silt. The B2t horizon is black, very dark gray, dark gray, or gray, with few to common mottles of yellowish brown, strong brown, reddish brown, and yellowish red.

The B3 horizon is 6 to 20 inches thick. It is clay loam or clay and is commonly mottled gray or dark gray.

The C horizon consists of sandy to clayey material.

By—Byars loam. This nearly level soil occurs on low terraces and in depressional areas along the Great Pee Dee River. Many delineated areas are long and narrow, occurring parallel to drainageways in the lowlands.

Included in mapping are a few areas of Cantey, Ponzer, Paxville, and Smithboro soils. Also included are a few areas of recent alluvial soils. Some areas include soils that have a solum ranging from 40 to 60 inches thick. There are some areas of these soils that have a surface layer of fine sandy loam or clay loam.

Most of this soil is in woodland. A few areas are in pasture and cultivated crops. Principal crops are corn and soybeans. Much of this soil is subject to occasional to frequent flooding. Extensive surface drainage systems are needed when this soil is used for cropland or pasture. Capability unit IIIw-2; woodland group 2w9.

Cahaba series

The soils of the Cahaba series are nearly level and well drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is about 9 inches of dark yellowish brown loamy sand. The subsurface layer is strong brown fine sandy loam about 3 inches thick. The next layer is about 36 inches thick. In sequence from the top, it is 6 inches of yellowish red, friable fine sandy loam; 20 inches of yellowish red friable sandy clay loam, with yellowish brown mottles in the lower 6 inches; 4 inches of strong brown friable fine sandy loam with yellowish red and yellowish brown mottles; and 6 inches of strong brown friable fine sandy loam with yellowish red mottles. The underlying material is loamy fine sand. The upper 10 inches is strong brown with brownish yellow mottles; and below 58 inches it is yellowish brown with strong brown mottles.

Cahaba soils occur with Summerton, Persanti, Eunola, Kenansville, and Lakeland soils. Cahaba soils have a coarser textured subsoil than Summerton and Persanti soils. Cahaba soils are better drained than Persanti and Eunola soils. Cahaba soils are redder, have a thinner surface layer, and have a finer textured subsoil than Kenansville soils. Cahaba soils have a finer textured subsoil than Lakeland soils.

Cahaba soils are low in organic matter. Permeability is moderate. Runoff is medium and the available water capacity is medium.

Representative profile of Cahaba loamy sand about 5 miles southwest of Marion, in a cultivated field 3,300 feet west of S.C. Secondary Road 25 and 200 feet south of field road.

Ap—0 to 9 inches, dark yellowish brown (10YR 4/4) loamy sand; weak fine granular structure; very friable; many fine roots; slightly acid (pH 6.2); abrupt smooth boundary.

A2—9 to 12 inches, strong brown (7.5YR 5/6) fine sandy loam; weak medium granular structure; very friable; many fine roots; strongly acid (pH 5.5); clear smooth boundary.

B1—12 to 18 inches, yellowish red (5YR 4/8) fine sandy loam; weak medium subangular blocky structure; friable; common fine roots; medium acid (pH 5.6); gradual wavy boundary.

B21t—18 to 32 inches, yellowish red (5YR 4/6) sandy clay loam; weak medium subangular structure; friable; few fine roots; common fine pores; thin patchy clay films on faces of peds and in pores; medium acid (pH 5.7); gradual wavy boundary.

B22t—32 to 38 inches, yellowish red (5YR 4/6) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; thin patchy clay films on faces of peds; strongly acid (pH 5.5); gradual wavy boundary.

B31—38 to 42 inches, strong brown (7.5YR 5/6) fine sandy loam; common medium distinct yellowish red (5YR 5/8) and yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; thin patchy clay films on faces of peds; strongly acid (pH 5.3); clear wavy boundary.

B32—42 to 48 inches, strong brown (7.5YR 5/8) fine sandy loam; common medium distinct yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; friable; common fine flakes of mica; strongly acid (pH 5.3); clear smooth boundary.

C1—48 to 58 inches, strong brown (7.5YR 5/6) loamy fine sand; few medium distinct brownish yellow (10YR 6/8) mottles; single grained; loose; common fine flakes of mica; strongly acid (pH 5.3); gradual wavy boundary.

C2—58 to 72 inches, yellowish brown (10YR 5/8) loamy fine sand; few medium distinct strong brown (7.5YR 5/6) mottles; single grained; loose; many fine flakes of mica; strongly acid (pH 5.5).

The solum ranges from 42 to 60 inches thick. These soils range from slightly acid to very strongly acid in the Ap or A1 horizon and medium acid to very strongly acid in the B and C horizons.

The A horizon is 8 to 16 inches thick. The Ap horizon is 7 to 9 inches thick and is dark yellowish brown, yellowish brown, brown, or dark brown. The A2 horizon, where present, is 3 to 8 inches of strong brown or brown sandy loam or fine sandy loam.

The B1 horizon, where present, is 6 to 12 inches of strong brown, yellowish red, or red. The B2t horizon is 20 to 40 inches thick. It is yellowish red or red. In some profiles the lower part of the B2t horizon is mottled with yellowish brown or strong brown. The B2t horizon is sandy loam, sandy clay loam, or clay loam. The B3 horizon, where present, is 9 to 20 inches of sandy loam or fine sandy loam that is yellowish red, strong brown, yellowish brown, or brownish yellow, often mottled with red, brown, or yellow. Few to many flakes of mica are commonly present in the lower part of the B horizon.

The C horizon is strong brown, yellowish brown, red, brownish yellow, or yellowish red, mottled with varying shades of yellow, brown, red, or gray. The C horizon is sand, loamy sand, sandy loam, or fine sandy loam.

CaA—Cahaba loamy sand, 0 to 2 percent slopes. This soil occurs on some of the higher ridges of stream terraces.

Included with this soil in mapping are small areas of Summerton, Eunola, Lakeland, and Kenansville soils. In some areas there are a few small depressional areas of poorly drained soils that are shown on the map by wet spot symbols. Also included are a few areas of soils with a yellowish brown or strong brown subsoil. A few areas include soils with a solum ranging to 65 inches thick. There are also some areas of soils with a surface layer of loamy fine sand, sandy loam, or fine sandy loam.

Most of this soil is cultivated, and with good management it can be cropped indefinitely. Good tilth is easily maintained. Principal crops are tobacco, cotton, corn, and soybeans. Capability unit I-1; woodland group 2o7.

Cantey series

The soils of the Cantey series are nearly level and poorly drained. They formed in stream deposits of clayey sediments.

In a typical profile the surface layer is very dark gray loam about 6 inches thick. The next layer to a depth of 75 inches is gray, very firm clay with yellowish brown, strong brown, and red mottles.

Cantey soils occur with Byars, Smithboro, and Persanti soils. Cantey soils do not have the thick dark-colored surface layer of the Byars soils. They are more poorly drained than Smithboro and Persanti soils.

Cantey soils are moderate in organic matter. Permeability is slow, and surface runoff is very slow. Available water capacity is medium.

Representative profile of Cantey loam about 2 3/4 miles northwest of Marion, 3/4 mile north of intersection of woods road and S.C. Secondary Road 38, in wooded area about 50 feet west of woods road.

A1—0 to 6 inches, very dark gray (10YR 3/1) loam; moderate medium granular structure; friable; many fine and medium roots; extremely acid (pH 4.3); clear smooth boundary.

B21tg—6 to 15 inches, gray (10YR 5/1) clay; common medium distinct yellowish brown (10YR 5/6) mottles and few fine prominent red mottles; moderate, medium, subangular and angular blocky structure; very firm; common fine and medium roots; few fine pores; thick continuous clay films on faces of peds; very strongly acid (pH 4.5); gradual wavy boundary.

B22tg—15 to 50 inches, gray (N 5/0) clay; common medium distinct strong brown (7.5YR 5/6) mottles and common medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; very firm; few fine and medium roots; few fine pores; thick continuous clay films on faces of peds; very strongly acid (pH 4.6); gradual wavy boundary.

B3g—50 to 75 inches, gray (10YR 5/1) clay; many medium distinct yellowish brown (10YR 5/6) mottles and common medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; very firm; extremely acid (pH 4.4).

The solum is 60 inches or more thick. These soils are strongly acid through extremely acid throughout.

The A horizon commonly ranges from 4 to 10 inches in thickness. The surface layer is 4 to 7 inches thick and is very dark gray, dark gray, black, or grayish brown. The A2 horizon, where present, is 3 to 5 inches of gray, grayish brown, or light brownish gray fine sandy loam or silt loam.

The B2t horizon is more than 40 inches thick. It is clay loam, silty clay loam, silty clay, or clay. The clay content in the upper 20 inches averages 35 to 60 percent. The B2t horizon is dark gray, gray, or light gray. It is commonly mottled in shades of yellow, brown, and red.

The B3 horizon is gray or light gray with few to many mottles in shades of yellow, brown, and red. It is sandy clay, clay loam, silty clay loam, silty clay, or clay.

Cn—Cantey loam. This is a nearly level soil in low areas adjacent to the larger streams.

Included with this soil in mapping are a few areas of Smithboro, Byars, Lumbee, and Persanti soils. Also included are a few long, narrow, depressed areas where water stands most of the year. Some areas of this soil have a silt loam, clay loam, or fine sandy loam surface layer.

The plow layer is difficult to keep in good tilth. It can be worked under only a narrow range of moisture conditions without clodding.

About 85 percent of this soil is woodland. The rest is in pasture and cultivated crops. The principal cultivated crops are corn and soybeans. Drainage is required before this soil can be used for either crops or pasture. Many areas are subject to frequent flooding. Capability unit IVw-2; woodland group 2w9.

Centenary series

The soils of the Centenary series are nearly level and moderately well drained. They formed in sandy Coastal Plain sediments.

In a typical profile the surface layer is 9 inches of very dark grayish brown sand. The subsurface layer is about 49 inches of sand. In the upper 15 inches it is yellowish brown with a few pale brown mottles; in the next 12 inches it is yellowish brown with strong brown and light gray mottles; and in the lower 22 inches it is light gray. The next layer is about 14 inches of organic-coated material, parts of which are slightly brittle. The upper 6 inches of this layer is dark grayish brown sand and the lower 8 inches is very dark brown loamy sand.

Centenary soils occur with Lakeland, Blanton, Rimini, Foreston, Eunola, Lynn Haven, Leon, and Rutlege soils. Centenary soils are more poorly drained than Lakeland, Blanton, and Rimini soils. Centenary soils have a spodic horizon, whereas Lakeland, Blanton, Foreston, Eunola, and Rutlege soils do not. Centenary soils are better drained than Lynn Haven, Leon, and Rutlege soils. Centenary soils have more fines in the horizons above the spodic horizon than Rimini soils.

Centenary soils are moderate in organic matter. Permeability is rapid. Runoff is slow. Available water capacity is low.

Representative profile of Centenary sand about 3 miles east of Marion, in cultivated field 150 feet north of S.C. Secondary Road 19.

Ap—0 to 9 inches, very dark grayish brown (10YR 3/2) sand; single grained; loose; many fine roots; slightly acid (pH 6.5); abrupt smooth boundary.

A21—9 to 24 inches, yellowish brown (10YR 5/4) sand; few fine faint pale brown mottles; single grained; loose; common fine roots; few clean sand grains; medium acid (pH 5.7); gradual wavy boundary.

A22—24 to 36 inches, yellowish brown (10YR 5/4) sand; common coarse distinct strong brown (7.5YR 5/8) mottles and common medium distinct light gray (10YR 7/2) mottles; single grained; loose; few fine roots; strongly acid (pH 5.2); gradual wavy boundary.

A23—36 to 58 inches, light gray (10YR 7/1) sand; single grained; loose; strongly acid (pH 5.4); clear wavy boundary.

B1h—58 to 64 inches, dark grayish brown (10YR 4/2) sand; single grained; loose; medium acid (pH 5.6); gradual wavy boundary.

B2h—64 to 72 inches, very dark brown (10YR 2/2) loamy sand; few to common medium distinct pale brown (10YR 6/3) bodies; weak fine granular structure; very friable; darker parts slightly brittle; most sand grains have organic coatings; strongly acid (pH 5.5).

These soils are slightly acid through very strongly acid in the Ap or A1 horizon and medium acid through very strongly acid in the lower horizons. Depth to the Bh horizon commonly ranges from 50 to 70 inches.

The Ap or A1 horizon is 5 to 9 inches thick. It is very dark grayish brown, dark grayish brown, very dark gray, and dark gray.

The A2 horizon is 41 to about 55 inches thick. The upper part of the A2 horizon has dominant colors of yellowish brown, brownish yellow, light yellowish brown, pale brown, or very pale brown. Mottles of varying shades of yellow, brown, and gray commonly occur in the middle portion of the A2 horizon. Mottles having chroma of 2 or less are within 40 inches of the surface. The lower part of the A2 horizon, immediately above the Bh horizon, has dominant colors of gray, light gray, or white. This horizon is 5 to 25 inches thick.

Some profiles have a 4 to 6 inch transitional B1h horizon that is dark grayish brown or dark brown. The B2h horizon is 7 to 20 inches thick. Colors are black, very dark brown, dark brown, or very dark gray. Texture of the Bh horizon is sand or loamy sand.

Some profiles have additional Bh layers below the first.

Ct—Centenary sand. This soil is nearly level and occurs on broad areas of the uplands and stream terraces.

Included with this soil in mapping are a few areas of Lakeland, Foreston, and Leon soils. Also included are a few depressional areas of poorly drained soils that are shown on the map by wet spot symbols. In a few small areas of soils depth to the spodic horizon ranges from 30 to 50 inches. About 30 percent of the acreage includes soils that do not have a spodic horizon but are similar to Centenary sand in use and management.

This soil is easy to till. About 65 percent of this soil is in crops or pasture. The rest is in woodland (fig. 2). Principal crops are corn, soybeans, tobacco, cotton, and pasture grasses.

Large fields of this soil are subject to wind erosion when they are tilled and left bare during dry springs. The water table, which normally remains 30 to 48 inches below the surface during the growing season, aids plant growth on this normally droughty soil. Capability unit IIIs-3; woodland group 2w2.

Chastain series

The Chastain series consists of nearly level, poorly drained soils that formed in clayey alluvial sediments on flood plains. They are subject to frequent flooding.

In a typical profile the surface layer is brown clay about 6 inches thick. The next layer is about 45 inches thick. The upper 24 inches of this layer is gray, firm clay loam with yellowish brown mottles; the next 15 inches is gray, firm clay with yellowish brown mottles; and the lower 6 inches is gray friable sandy clay loam. The underlying material is light brownish gray sand.

Chastain soils occur with Tawcaw, Byars, and Cantey soils. Chastain soils are more poorly drained than Tawcaw soils. Chastain soils lack an argillic horizon, which occurs in Byars and Cantey soils.

Chastain soils are moderate in organic matter. Permeability is slow and runoff is very slow. The water table is near the surface most of the time. Available water capacity is high.

These soils were mapped in an association with Tawcaw soils.

Representative profile of Chastain clay in an area of Tawcaw-Chastain association, about 11 miles southwest of Marion, 100 feet south of dirt road across the Great Pee Dee River swamp.

A1—0 to 6 inches, brown (10YR 4/3) clay; few fine distinct gray and yellowish brown mottles; weak medium subangular blocky structure; firm; many fine and medium roots; common fine pores; strongly acid (pH 5.2); clear smooth boundary.

B21g—6 to 30 inches, gray (10YR 5/1) clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common fine roots and pores; few flakes of mica; strongly acid (pH 5.1); gradual wavy boundary.

B22g—30 to 45 inches, gray (10YR 5/1) clay; common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common fine roots and pores; few flakes of mica; strongly acid (pH 5.1); gradual wavy boundary.

B3g—45 to 51 inches, gray (N 6/0) sandy clay loam; massive; friable; few flakes of mica; strongly acid (pH 5.5); gradual smooth boundary.

IICg—51 to 72 inches, light brownish gray (10YR 6/2) sand; single grained; loose; common flakes of mica; strongly acid (pH 5.5).

The solum ranges from 40 to 60 inches thick. These soils are strongly acid or very strongly acid throughout the profile.

The A horizon is 4 to 14 inches thick and is commonly brown, grayish brown, gray, or yellowish brown. Texture of the A horizon is clay, silty clay, silty clay loam, clay loam, or loam.

The B2 horizon is 18 to more than 50 inches thick. It is gray, dark gray, or light gray with mottles in shades of yellow, brown, and red. Texture of the B2 horizon is clay, silty clay, or clay loam. The B2 horizon appears massive when wet, but is weak to moderate subangular blocky when moist.

The B3 horizon is 5 to 10 inches thick. It is gray, light gray, or dark gray with mottles in shades of yellow and brown. Texture of the B3 horizon is sandy clay loam, clay loam, or loam.

The C horizon is light brownish gray, gray, or greenish gray sand, loamy sand, or sandy loam.

Coxville series

The soils of the Coxville series are nearly level and poorly drained. They formed in clayey Coastal Plain sediments.

In a typical profile the surface layer is about 7 inches of very dark gray fine sandy loam. The next layer extends to a depth of 72 inches. The upper 4 inches is light brownish gray friable sandy clay loam, and the lower 61 inches is gray firm clay with yellowish brown and red mottles.

Coxville soils occur with Dothan, Goldsboro, Duplin, Persanti, Dunbar, Lynchburg, Rains, and Pantego soils. Coxville soils have a finer textured subsoil than Dothan, Goldsboro, Lynchburg, Rains, and Pantego soils. Coxville soils are more poorly drained than Duplin, Persanti, and Dunbar soils.

Coxville soils are moderate in organic matter. Permeability is moderately slow. Surface runoff is slow to ponded. Available water capacity is medium to high.

Representative profile of Coxville fine sandy loam about 7 miles north of Marion, in cultivated field 3/4 mile south of S.C. Secondary Road 22 and 750 feet east of dirt road.

Ap—0 to 7 inches, very dark gray (10YR 3/1) fine sandy loam; weak fine granular structure; very friable; common fine roots; strongly acid (pH 5.3); clear smooth boundary.

B1g—7 to 11 inches, light brownish gray (10YR 6/2) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; common fine pores; strongly acid (pH 5.2); clear smooth boundary.

B21tg—11 to 20 inches, gray (10YR 6/1) clay; common medium distinct yellowish brown (10YR 5/6) mottles and few medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; thin continuous clay films on faces of peds; very strongly acid (pH 4.8); gradual wavy boundary.

B22tg—20 to 34 inches, gray (10YR 6/1) clay; common medium distinct yellowish brown (10YR 5/6) mottles and common medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; few fine pores; thin continuous clay films on faces of peds; very strongly acid (pH 4.8); gradual wavy boundary.

B23tg—34 to 60 inches, gray (10YR 6/1) clay; few medium distinct yellowish brown (10YR 5/6) mottles and few medium prominent red (2.5YR 4/8) mottles; moderate medium subangular blocky structure; firm; few fine pores; thin continuous clay films on faces of peds; very strongly acid (pH 4.6); gradual wavy boundary.

B3g—60 to 72 inches, mottled gray (10YR 6/1), yellowish brown (10YR 5/6), and red (2.5YR 4/8) clay; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; very strongly acid (pH 4.6).

The solum is 60 inches or more thick. The A horizon ranges from medium acid through very strongly acid, and the B horizon is strongly acid or very strongly acid.

The A horizon is 5 to 12 inches thick. The A1 or Ap horizon is 4 to 8 inches thick and is black, very dark gray, or dark gray. The A2 horizon, where present, is 2 to 4 inches of gray or light gray fine sandy loam.

The B1 horizon, where present, is 4 to 12 inches of gray, light brownish gray, or grayish brown sandy clay loam, loam, or clay loam.

The B2t horizon is 30 to more than 50 inches thick. It is predominantly gray, dark gray, or light gray sandy clay, clay, or clay loam with few to many mottles in shades of yellow, brown, and red.

The B3 horizon is gray, dark gray, or light gray with mottles in shades of yellow, brown, and red. Texture of the B3 horizon is clay, sandy clay, or sandy clay loam.

Cx—Coxville fine sandy loam. This soil is nearly level and occurs on broad flats to slight depressions and oval shaped bays.

Included with some areas of this soil in mapping are a few small areas of Rains, Pantego, Lynchburg, Smithboro, and Dunbar soils. Also included are some areas of soils with a sandy loam, loam, or clay loam surface layer.

About 70 percent of this soil is woodland. The rest is cropland and pasture. The principal crops are corn, soybeans, small grains, and pasture grasses.

When this soil is used for crops, a surface drainage system, a tile drainage system, or a combination of these is essential. Drainage is also needed for improved pastures. Capability unit IIIw-2; woodland group 2w9.

Dothan series

The soils of the Dothan series are nearly level to gently sloping and well drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is 8 inches of grayish brown loamy fine sand. The subsurface layer is pale brown loamy fine sand about 8 inches thick. The subsoil is friable sandy clay loam to a depth of 75 inches. In sequence from the top, it is 24 inches of yellowish brown with few plinthite nodules; 8 inches of yellowish brown with about 10 percent nodules of plinthite; 10 inches of yellow with red and gray mottles and about 20 percent nodules of plinthite; and 17 inches of mottled yellowish brown, red, and gray with about 10 percent nodules of plinthite.

Dothan soils occur with Fuquay, Pocalla, Varina, Brogdon, Goldsboro, Coxville, and Rains soils. Dothan soils have a thinner A horizon than Fuquay and Pocalla soils. Dothan soils have a coarser textured subsoil than Varina soils. Dothan soils are finer textured in the upper part of the subsoil than Brogdon soils. Dothan soils are better drained than Goldsboro, Coxville, and Rains soils.

Dothan soils are low in organic matter. Permeability is moderately slow. Surface runoff is medium. Available water capacity is medium.

Representative profile of Dothan loamy fine sand about 1 1/2 miles south of Smithboro in cultivated field 300 feet east of S.C.L. Railroad.

Ap—0 to 8 inches, grayish brown (10YR 5/2) loamy fine sand; weak fine granular structure; very friable; many fine roots; slightly acid (pH 6.3); abrupt smooth boundary.

A2—8 to 16 inches, pale brown (10YR 6/3) loamy fine sand; weak fine granular structure; very friable; common fine roots; medium acid (pH 5.6); clear smooth boundary.

B21t—16 to 30 inches, yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; common fine roots and pores; few coarse red brittle bodies; few patchy clay films on faces of peds and in pores; sand grains coated and bridged with clay; strongly acid (pH 5.2); gradual wavy boundary.

B22t—30 to 40 inches, yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; few fine roots; common fine pores; few coarse red brittle bodies; thin patchy clay films on faces of peds; strongly acid (pH 5.2); gradual wavy boundary.

B23t—40 to 48 inches, yellowish brown (10YR 5/8) sandy clay loam; weak medium subangular blocky structure; friable; common fine pores; common (about 10 percent) coarse red firm brittle bodies; thin patchy clay films on faces of peds; strongly acid (pH 5.1); gradual wavy boundary.

B24t—48 to 58 inches, yellow (10YR 7/6) sandy clay loam; common medium prominent red (2.5YR 4/8) mottles and common medium distinct gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; common (about 20 percent) coarse red firm brittle bodies; thin patchy clay films on faces of peds; strongly acid (pH 5.2); gradual wavy boundary.

B25t—58 to 75 inches, mottled yellowish brown (10YR 5/6) and red (2.5YR 4/8) sandy clay loam; many medium distinct gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; common (about 10 percent) coarse red firm brittle bodies; patchy clay films on faces of peds; strongly acid (pH 5.1).

The solum is more than 70 inches thick. The A horizon ranges from slightly acid through strongly acid. The Bt horizon is strongly acid or very strongly acid.

The A horizon is 6 to 18 inches thick. The Ap horizon is 6 to 9 inches thick and is grayish brown, brown, or dark grayish brown. The A2 horizon is up to 11 inches thick. It is pale brown or light yellowish brown loamy sand or loamy fine sand.

The B1 horizon, where present, is 4 to 10 inches of yellowish brown sandy loam.

The B2t horizon is more than 50 inches thick. The upper 20 to 30 inches is yellowish brown or strong brown, and some pedons have few to common strong brown, yellowish red, or red mottles. The lower part of the B2t horizon is mottled with varying shades of yellow, brown, red, and gray. The upper part of the B2t horizon is sandy loam or sandy clay loam. The lower part contains 8 to 25 percent by volume of plinthite. Texture of the lower horizon is mainly sandy clay loam but ranges to sandy clay.

DaA—Dothan loamy fine sand, 0 to 2 percent slopes. This nearly level soil has the profile described as representative of the series.

Included with this soil in mapping are small areas of Fuquay, Brogdon, Varina, and Goldsboro soils. A few areas of soils with less than 5 percent nodules of plinthite within 60 inches of the surface are included. Long narrow areas of 2 to 6 percent slopes are included in some places. There are a few areas included that have a clay loam subsoil. Some included small depressed areas of poorly drained soils are shown on the map by wet spot symbols. Some areas of this soil have a surface layer of loamy sand or sandy loam.

Most of this soil is in row crops. Principal crops are tobacco, cotton, corn, and soybeans. This soil is easily tilled within a wide range of moisture content. Stripcropping, windbreaks, and cropping systems that keep crop residues on the surface are needed to reduce the soil loss and damage to crops caused by soil blowing on many fields. Capability unit I-5; woodland group 2o1.

DaB—Dothan loamy fine sand, 2 to 6 percent slopes. This gently sloping soil is on broad ridges and also on narrow side slopes parallel to streams and drainageways.

Included with this soil in mapping are small areas of Fuquay, Varina, and Summerton soils. Also included are small areas where erosion has exposed the subsoil. There are a few small areas with slopes of less than 2 percent or up to 8 percent. A few areas include soils with less than 5 percent nodules of plinthite within 60 inches of the surface. Some included small depressed areas of poorly drained soils are shown on the map by wet spot symbols. Some areas of this soil have a surface layer of loamy sand or sandy loam.

Most of this soil is cultivated. The principal crops are cotton, corn, tobacco, soybeans, and small grain. Bahiagrass and Coastal bermudagrass are the best hay and pasture plants.

Erosion is the main hazard on this soil. Contour tillage, crop rotations that include sod crops, terraces, and grassed waterways are some of the conservation practices that help control erosion. Crop residue kept on or near the surface increases infiltration and reduces erosion. Capability unit IIe-5; woodland group 2o1.

Dunbar series

The soils of the Dunbar series are nearly level and somewhat poorly drained. They formed in clayey Coastal Plain sediments.

In a typical profile the surface layer is dark grayish brown loamy sand about 7 inches thick. The subsurface layer is yellowish brown sandy loam about 4 inches thick. The subsoil extends to a depth of 72 inches. In sequence from the top, it is 12 inches of gray firm sandy clay with yellowish brown and yellowish red mottles; 33 inches of dark gray firm sandy clay with yellowish brown and reddish brown mottles; 6 inches of dark gray firm sandy clay mottled with yellowish brown, red, and light gray; and 10 inches of dark gray firm sandy clay loam mottled with light gray and strong brown.

The Dunbar soils occur with Pantego, Rains, Coxville, Lynchburg, Smithboro, Goldsboro, Persanti, and Duplin soils. Dunbar soils are more poorly drained than Goldsboro, Persanti, and Duplin soils. Dunbar soils are better drained than Pantego, Rains, and Coxville soils. Dunbar soils are lower in silt content and have a subsoil that is less plastic and sticky than the Smithboro soils. Dunbar soils have more clay in the subsoil than Lynchburg soils.

Dunbar soils are moderate in organic matter. Permeability is moderately slow, and surface runoff is slow. Available water capacity is medium.

Representative profile of Dunbar loamy sand about 2.5 miles west of Mullins, 0.5 mile north of S.C.L. railroad in cleared field 200 feet east of S.C. Secondary Road 84.

Ap—0 to 7 inches, dark grayish brown (10YR 4/2) loamy sand, weak fine granular structure; very friable; common fine and medium roots; strongly acid (pH 5.4); abrupt smooth boundary.

A2—7 to 11 inches, yellowish brown (10YR 5/4) sandy loam, weak fine granular structure; very friable, common fine roots; strongly acid (pH 5.2); clear smooth boundary.

B21tg—11 to 23 inches, gray (10YR 5/1) sandy clay; common medium distinct yellowish brown (10YR 5/6) mottles and common medium prominent yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; firm; few fine roots and pores; thick patchy clay films on faces of peds; very strongly acid (pH 4.6); gradual wavy boundary.

B22tg—23 to 56 inches, dark gray (10YR 4/1) sandy clay; common medium distinct yellowish brown (10YR 5/6) and reddish brown (5YR 4/4) mottles; strong medium subangular blocky structure; firm; few fine roots and pores; thick continuous clay films on faces of peds and old root channels; very strongly acid (pH 4.8); gradual wavy boundary.

B23tg—56 to 62 inches, dark gray (10YR 4/1) sandy clay; common medium distinct yellowish brown (10YR 5/6) mottles; few medium prominent red (2.5YR 4/8) mottles and few medium distinct light gray (10YR 6/1) mottles; moderate medium subangular blocky structure, firm; thin patchy clay films on faces of peds; very strongly acid (pH 4.8); gradual wavy boundary.

B3g—62 to 72 inches, dark gray (10YR 4/1) sandy clay loam; common medium distinct light gray (10YR 6/1) mottles and common fine distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; very strongly acid (pH 4.7).

Thickness of the solum is 60 to more than 72 inches. This soil is strongly acid or very strongly acid throughout.

Thickness of the A horizon ranges from 6 to 11 inches. The Ap horizon is 6 to 9 inches thick and is dark gray or dark grayish brown. The A2 horizon is not in some pedons.

The B1 horizon, where present, is about 4 to 6 inches of pale brown, yellowish brown, or light yellowish brown sandy clay loam.

The B2t horizon is from 33 to more than 60 inches thick. Texture of the B2t horizon includes clay loam, sandy clay, and clay. The upper part of the B2t horizon is gray, yellowish brown, brown, or strong brown with few to many mottles of varying shades of gray, red, yellow, and brown. Mottles with chroma of 2 or less occur in the upper 10 inches of the B2t horizon. The lower B2t horizon is dominantly gray, dark gray, or light gray, with common to many mottles in shades of red, yellow, and brown.

The B3 horizon is about 8 to 12 inches thick and is gray, dark gray, or light gray with common to many mottles of varying shades of red, yellow, and brown. It is sandy clay loam, sandy clay, or clay.

Dn—Dunbar loamy sand. This soil is nearly level and occurs in broad, low areas.

Included with this soil in mapping are small areas of Goldsboro, Persanti, Duplin, Lynchburg, and Smithboro soils. Also included are areas with a fine sandy loam, loamy fine sand, or sandy loam surface layer. Small wet depressed areas are included and are shown on the map by wet spot symbols.

About 65 percent of this soil is in crops or pasture. The rest is in woodland. Tilth is generally good. The principal cultivated crops are corn, soybeans, cotton, tobacco, and small grain. Drainage is usually needed for optimum production of crops on this soil. Capability unit IIw-5; woodland group 2w8.

Duplin series

The soils of the Duplin series are nearly level and moderately well drained. They formed in clayey Coastal Plain sediments.

In a typical profile the surface layer is dark grayish brown fine sandy loam about 7 inches thick. The subsoil extends to a depth of 80 inches. In sequence from the top, it is 7 inches of brownish yellow firm clay loam; 15 inches of yellowish brown firm clay loam mottled with gray and yellowish red; 33 inches of mottled gray, brown, and red firm sandy clay; and 18 inches of mottled gray, brown, and red firm sandy clay loam.

Duplin soils occur with Varina, Dothan, Persanti, Goldsboro, Dunbar, and Coxville soils. Duplin soils do not have the plinthite that occurs in Varina and Dothan soils and are not so well drained. Duplin soils have less silt throughout than Persanti soils. They have a finer textured subsoil than Goldsboro soils and they are better drained than Dunbar and Coxville soils.

Duplin soils are low in organic matter. Permeability is moderately slow, and runoff is slow. Available water capacity is medium.

Representative profile of Duplin fine sandy loam about 3 miles northeast of Marion, in an idle field 150 feet west of S.C. Highway 41-A.

Ap—0 to 7 inches, dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; strongly acid (pH 5.4); abrupt smooth boundary.

B21t—7 to 14 inches, brownish yellow (10YR 6/6) clay loam; few medium distinct yellowish red (5YR 4/8) mottles; weak medium subangular blocky structure; firm; few fine roots; common fine pores; thin patchy clay films on faces of peds and in pores; very strongly acid (pH 4.9); gradual smooth boundary.

B22t—14 to 29 inches, yellowish brown (10YR 5/4) clay; common coarse distinct gray (10YR 5/1) mottles and common medium prominent yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; thin broken clay films on faces of peds; very strongly acid (pH 4.9); gradual wavy boundary.

B23t—29 to 62 inches, mottled gray (10YR 5/1), strong brown (7.5YR 5/8), and red (2.5YR 4/6) sandy clay; common medium distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; firm; few (2-3 percent) small red brittle bodies; thin broken clay films on faces of peds; very strongly acid (pH 5.0); gradual wavy boundary.

B3—62 to 80 inches, mottled gray (10YR 5/1) and brownish yellow (10YR 6/6) sandy clay loam; common medium prominent red (2.5YR 4/8) mottles and common medium distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; very strongly acid (pH 4.8).

Thickness of the solum is 60 to more than 72 inches. The A horizon is medium acid through very strongly acid, and the B horizon is strongly acid or very strongly acid.

The A horizon is commonly 6 to 8 inches thick, but ranges from 6 to 12 inches. The plow layer, or surface 6 to 8 inches, is grayish brown, dark grayish brown, dark gray, or brown. The A2 horizon, where present, is 2 to 4 inches of light yellowish brown, brown, or pale brown loamy fine sand or fine sandy loam.

The B2t horizon is 40 to more than 55 inches thick. It is clay loam, sandy clay, and clay. The upper part of the B2t horizon is commonly yellowish brown or brownish yellow with few to common mottles of brown and red. Mottles with chroma of 2 or less occur within 30 inches of the surface. The lower portion of the B2t horizon is highly mottled with varying shades of yellow, brown, gray, and red.

The B3 horizon is highly mottled with varying shades of gray, yellow, brown, and red. It is sandy clay loam, sandy clay, or clay.

DuA—Duplin fine sandy loam, 0 to 2 percent slopes. This soil occurs on broad areas.

Included with this soil in mapping are small areas of Goldsboro, Dunbar, Persanti, and Varina soils. Small wet depressed areas are included and are shown on the map by wet spot symbols. Also included are small areas of soils that have texture and drainage similar to Duplin fine sandy loam, but contain more than 5 percent nodules of plinthite within 60 inches of the surface. Included also are areas with a sandy loam and loamy fine sand surface layer.

About 75 percent of this soil is cultivated. The rest is in woodland. Tilth is generally good. The principal crops are tobacco, cotton, corn, soybeans, and small grain. Drainage is frequently needed for the optimum production of crops on this soil. Capability unit IIw-5; woodland group 2w8.

Eunola series

The soils of the Eunola series are nearly level and moderately well drained. They formed in loamy sediments on stream terraces and Coastal Plain uplands.

In a typical profile the surface layer is dark grayish brown loamy sand about 9 inches thick. The subsoil is about 41 inches thick. In the upper 16 inches it is brown friable sandy clay loam with strong brown mottles; the next 6 inches is yellowish brown friable sandy loam with strong brown and gray mottles; and the lower 19 inches is mottled gray and brown friable sandy loam. The underlying material is mottled brownish yellow loamy sand.

The Eunola soils occur with Cahaba, Kenansville, Persanti, Smithboro, and Cantey soils. Eunola soils are not so well drained as Cahaba and Kenansville soils. Eunola soils have a coarser textured subsoil than Persanti, Smithboro, and Cantey soils; in addition, Eunola soils are better drained than Smithboro and Cantey soils.

Eunola soils are low in organic matter. Permeability is moderate, and surface runoff is slow. Available water capacity is medium.

Representative profile of Eunola loamy sand about 5 miles west of Marion, 400 feet north of intersection of S.C. Secondary Roads 407 and 64, in cultivated field 150 west of S.C. Secondary Road 64.

Ap—0 to 9 inches, dark grayish brown (10YR 4/2) loamy sand; weak fine granular structure; very friable; common fine and medium roots; medium acid (pH 5.7); abrupt smooth boundary.

B2t—9 to 25 inches, brown (10YR 5/3) sandy clay loam; many coarse distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots and pores; thin patchy clay films on faces of peds; very strongly acid (pH 5.0); gradual wavy boundary.

B31—25 to 31 inches, yellowish brown (10YR 5/4) sandy loam; common medium distinct strong brown (7.5YR 5/6) and gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; few fine roots and pores; strongly acid (pH 5.2); clear wavy boundary.

B32—31 to 45 inches, gray (10YR 6/1) sandy loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; few fine roots and pores; pockets and lenses of sandy clay loam; strongly acid (pH 5.1); gradual wavy boundary.

B33—45 to 50 inches, brown (10YR 5/3) sandy loam; common coarse distinct light gray (10YR 7/1) mottles and common fine prominent yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable; very strongly acid (pH 5.0); gradual smooth boundary.

C—50 to 75 inches, brownish yellow (10YR 6/6) loamy sand; common fine distinct light gray (10YR 7/1) mottles; structureless; very friable; strongly acid (pH 5.2).

Thickness of the solum is 40 to 59 inches. The A horizon ranges from medium acid through very strongly acid, and the B and C horizons are strongly acid or very strongly acid.

Thickness of the A horizon ranges from 8 to 19 inches. The Ap or A1 horizon is 6 to 9 inches thick and is very dark gray, very dark grayish brown, dark brown, or dark grayish brown. The A2 horizon, where present, is 6 to 12 inches of pale brown, brownish yellow, or yellowish brown loamy sand.

The B1 horizon, where present, is 5 to 7 inches thick and is light yellowish brown or yellowish brown sandy loam.

The B2t horizon is 15 to 40 inches thick. The upper part is yellowish brown, brownish yellow, or brown with few to common mottles in varying shades of gray and brown. The lower part is yellowish brown or gray with common to many mottles of gray, yellowish brown, or strong brown.

The B3 horizon is 4 to 25 inches thick. It is gray or brown with mottles of yellowish brown, gray, or yellowish red.

The C horizon is brownish yellow or gray mottled with varying shades of brown or gray. Texture of the C horizon is loamy sand or sand.

EuA—Eunola loamy sand, 0 to 2 percent slopes. This soil occurs on stream terraces and uplands.

Included with this soil in mapping are small areas of Cahaba, Persanti, Smithboro, Centenary, and Foreston soils. Also included are a few areas with a sandy surface layer 20 to 30 inches thick. Small depressed areas of poorly drained soils are included and are shown on the map by wet spot symbols. Also included are areas with a sandy loam, fine sandy loam, and loamy fine sand surface layer. There are a few areas of soils with a clay loam subsoil. A few areas include soils with a solum 25 to 40 inches thick.

About 70 percent of this soil is in cultivated crops or pasture. The rest is in woodland. Tilth is good. The principal cultivated crops are corn, soybeans, tobacco, and small grain. Some drainage is usually needed for optimum crop production on this soil. Capability unit IIw-2; woodland group 2w8.

Foreston series

The soils of the Foreston series are nearly level and moderately well drained. They formed in loamy and sandy Coastal Plain sediments.

In a typical profile the surface layer is very dark grayish brown loamy sand about 9 inches thick. The subsoil extends to a depth of 72 inches. In sequence from the top, it is 6 inches of brownish yellow very friable loamy sand; 12 inches of yellowish brown friable sandy loam; 14 inches of very pale brown very friable sandy loam with light gray mottles; 10 inches of mottled very pale brown and light gray very friable loamy sand with pockets of clean sand grains; and 21 inches of pale brown very friable loamy sand with pockets of clean sand grains.

Foreston soils occur with Dothan, Fuquay, Centenary, Goldsboro, Lynchburg, and Rains soils. Foreston soils have a coarser textured subsoil than Dothan, Fuquay, Goldsboro, Lynchburg, and Rains soils and a finer textured subsoil than Centenary soils. Foreston soils are not so well drained as Dothan and Fuquay soils; they are better drained than Lynchburg and Rains soils.

Foreston soils are moderate in organic-matter content. Permeability is moderately rapid. Surface runoff is slow. Available water capacity is low to medium.

Representative profile of Foreston loamy sand, 6 miles southeast of Marion, 2,000 feet north of intersection of S.C. Secondary Roads 329 and 32, in cultivated field about 300 feet west of S.C. Secondary Road 329.

Ap—0 to 9 inches, very dark grayish brown (10YR 3/2) loamy sand; weak fine granular structure; very friable; common fine roots; strongly acid (pH 5.4); abrupt smooth boundary.

B1—9 to 15 inches, brownish yellow (10YR 6/6) loamy sand; weak medium subangular blocky structure; very friable; common fine roots; very strongly acid (pH 5.0); clear smooth boundary.

B21t—15 to 27 inches, yellowish brown (10YR 5/8) sandy loam; few medium distinct brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; few fine roots and pores; sand grains coated and bridged with clay; very strongly acid (pH 4.6); clear smooth boundary.

B22t—27 to 41 inches, very pale brown (10YR 7/4) sandy loam; common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; very friable; few fine roots and pores; sand grains coated and bridged; very strongly acid (pH 4.9); gradual wavy boundary.

B31—41 to 51 inches, mottled very pale brown (10YR 7/4) and light gray (10YR 7/2) loamy sand with pockets of clean sand grains; few medium distinct yellowish brown (10YR 5/6) mottles; single grained; very friable; very strongly acid (pH 4.8); gradual wavy boundary.

B32—51 to 72 inches, pale brown (10YR 6/3) loamy sand with pockets of clean sand grains; single grained; very friable; very strongly acid (pH 4.8).

The solum is more than 60 inches thick. The A horizon ranges from medium acid through very strongly acid, and the B horizon is strongly acid or very strongly acid.

The A horizon is 8 to 18 inches thick. The Ap or A1 horizon is 7 to 9 inches of very dark grayish brown, dark grayish brown, very dark gray, or dark gray. The A2 horizon, where present, is as much as 11 inches of pale brown, light yellowish brown, very pale brown, or brownish yellow sand or loamy sand.

The B1 horizon is 5 to 8 inches of very pale brown, light yellowish brown, or brownish yellow.

The B2t horizon is 16 to 28 inches thick. It is yellowish brown, light yellowish brown, or very pale brown. In some places it is mottled with shades of yellow, brown, red, or gray— commonly in the lower part.

The B3 horizon is yellowish brown, brownish yellow, pale brown, very pale brown, grayish brown, gray, or light gray loamy sand or sand with mottles in shades of gray, brown, and yellow.

Fo—Foreston loamy sand. This soil is nearly level and occurs in broad areas on the divides between drainageways.

Included with this soil in mapping are small areas of Brogdon, Goldsboro, Centenary, and Lynchburg soils. Some areas include soils that lack mottles of chroma 2 or less within 30 inches of the surface. A few areas include soils that have a dark colored organic-coated horizon at a depth of 30 to 70 inches. Depressed areas of poorly drained soils are shown on the map by wet spot symbols. Large areas of this soil have a sand surface layer. Also included are a few areas with horizons of sandy clay loam to clay at a depth of more than 50 inches. A few areas include soils with a sandy surface layer 20 to 25 inches thick.

Good tilth is easily maintained on this soil. Most of the acreage is in cultivated crops or pasture. The principal crops are tobacco, corn, soybeans, cotton, and small grain. Drainage is usually required for the production of crops. Capability unit IIw-2; woodland group 2w2.

Fuquay series

The soils of the Fuquay series are nearly level to sloping and well drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is dark grayish brown sand about 8 inches thick. The subsurface layer is loamy sand about 20 inches thick; the upper 3 inches is yellowish brown, and the lower 17 inches is pale brown. The subsoil to a depth of 80 inches is friable sandy clay loam. The upper 21 inches is yellowish brown and contains about 5 percent nodules of plinthite; the lower 31 inches is yellowish brown with gray, red, and light yellowish brown mottles and contains about 15 percent nodules of plinthite.

Fuquay soils occur with the Dothan, Varina, Pocalla, Blanton, and Lakeland soils. Fuquay soils contain more than 5 percent nodules of plinthite within 60 inches of the surface, but. Blanton and Lakeland soils do not. Fuquay soils do not have an A'2 horizon which Pocalla soils have. Fuquay soils have a thicker surface layer than Dothan and Varina soils and have a thinner surface layer than Blanton soils. Fuquay soils have a Bt horizon, but Lakeland soils do not.

Fuquay soils are low in organic matter. Permeability is moderate in the upper part of the subsoil and slow in the lower part. Runoff is slow. Available water capacity is low to medium.

Representative profile of Fuquay sand about 1 mile southeast of Smithboro, about 2,500 feet south of S.C. Highway 917, in old pasture about 300 feet west of dirt road.

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) sand; single grained; loose; many fine roots; few iron pebbles; strongly acid (pH 5.4); abrupt smooth boundary.

A21—8 to 11 inches, yellowish brown (10YR 5/4) loamy sand; single grained; slightly compacted; few to common clean sand grains; common fine roots; common fine pores; medium acid (pH 5.6); clear smooth boundary.

A22—11 to 28 inches, pale brown (10YR 6/3) loamy sand; single grained; loose; common to many clean sand grains; common fine roots; medium acid (pH 5.6); clear wavy boundary.

B21t—28 to 49 inches, yellowish brown (10YR 5/6) sandy clay loam; few medium prominent yellowish red (5YR 4/8) and red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; common (about 5 percent) coarse red brittle bodies; thin patchy clay films on faces of peds and in old root channels; very strongly acid (pH 5.0); clear smooth boundary.

B22t—49 to 80 inches, yellowish brown (10YR 5/6) sandy clay loam; many coarse distinct gray (10YR 6/1) mottles, many coarse prominent red (2.5YR 4/8) mottles, and common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; common (about 15 percent) coarse red brittle bodies; thin patchy clay films on faces of peds; very strongly acid (pH 4.8).

The solum is more than 60 inches thick. The A horizon is medium acid through very strongly acid. The Bt horizon is strongly acid or very strongly acid.

The A horizon is 21 to 39 inches thick. The Ap or A1 horizon is 5 to 10 inches thick and is dark gray, dark grayish brown, grayish brown, or brown. The A2 horizon is 12 to 30 inches thick and is pale brown, very pale brown, light yellowish brown, or yellowish brown. Texture of the A2 horizon is sand, loamy sand, or loamy fine sand. A few hard sesquioxide pebbles commonly occur on the surface and throughout the A horizon.

The B1 horizon, where present, is commonly 5 to 10 inches of yellowish brown, brownish yellow, or strong brown sandy loam.

The B2t horizon commonly ranges from 30 to more than 50 inches thick. The top 10 to 20 inches of the B2t horizon is yellowish brown or strong brown sandy loam or sandy clay loam. Yellowish red to red plinthite nodules increase in abundance from the upper B2t horizon downward. The lower part of the B2t horizon is mottled with varying shades of yellow, brown, red, and gray. It is 5 to 20 percent by volume plinthite nodules, which are commonly most numerous at depths between 48 and 60 inches. Texture of this lower B2t horizon is sandy clay loam or sandy clay.

FuB—Fuquay sand, 0 to 6 percent slopes. This nearly level to gently sloping soil has the profile described as representative of the series.

Included with this soil in mapping are a few small areas of Dothan, Pocalla, Blanton, and Lakeland soils. Also included are a few areas which have less than 5 percent nodules of plinthite to a depth of 60 inches. There are a few areas of soils with 6 to 10 percent slopes. There are also a few inclusions of long, narrow areas of alluvial soils. Some delineations of this soil include small wet depressed areas that are shown on the map by wet spot symbols.

This soil is easily tilled and can be cultivated over a wide range of moisture conditions.

About 65 percent of this soil is cropland and pasture. The rest is woodland. The principal crops are cotton, tobacco, corn, soybeans, Coastal bermudagrass, bahiagrass, and sericea lespedeza. This soil is slightly droughty during periods of low rainfall. Soil blowing is a hazard on some of the larger fields. Stripcropping, windbreaks, and cropping systems that keep crop residues on

the soil surface are used to control erosion and maintain organic-matter content in this soil. Capability unit IIs-5; woodland group 3s2.

FuC—Fuquay sand, 6 to 10 percent slopes. This sloping soil is on side slopes parallel to streams and drainageways.

Included with this soil in mapping are small areas of Dothan, Summerton, Blanton, and Lakeland soils. Also included are a few areas which have less than 5 percent nodules of plinthite to a depth of 60 inches. There are a few long narrow areas of alluvial soils in some places. A few small areas of soils with 2 to 6 percent slopes and 10 to 15 percent slopes are also included.

This soil can be cultivated over a wide range of moisture conditions.

About 75 percent of this soil is in woodland. The rest is in crops or pasture. The principal crops are corn and soybeans, Coastal bermudagrass, bahiagrass, and sericea lespedeza. Because of the thick, sandy surface layer, this soil is slightly droughty in dry periods. Soil blowing is a hazard when it is used for row crops. Terraces, vegetated waterways, contour tillage, and crop residue management are among the practices used to control erosion. Capability unit IIIs-2; woodland group 3s2.

Goldsboro series

The soils of the Goldsboro series are nearly level and moderately well drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is about 8 inches of dark grayish brown loamy fine sand. The subsurface layer is about 4 inches of pale brown fine sandy loam. The subsoil extends to a depth of 75 inches. In sequence from the top, it is 4 inches of brownish yellow friable fine sandy loam with strong brown and pale brown mottles; 14 inches of yellowish brown friable fine sandy loam with pale brown, strong brown, and gray mottles; 15 inches of yellowish brown friable sandy clay loam with gray and red mottles; 13 inches of mottled yellowish brown and gray friable sandy clay loam with red mottles; and 17 inches of mottled yellowish brown, gray, pale brown, and red friable sandy clay loam.

Goldsboro soils are associated with Dothan, Duplin, Lynchburg, Dunbar, Rains, and Coxville soils. Goldsboro soils are not so well drained as Dothan soils. They have a coarser textured subsoil than Duplin, Dunbar, and Coxville soils. Goldsboro soils are better drained than Lynchburg, Dunbar, Rains, and Coxville soils.

Goldsboro soils are moderate in organic-matter content. Permeability is moderate. Surface runoff is slow to medium. Available water capacity is medium.

Representative profile of Goldsboro loamy fine sand about 1.5 miles east of Mullins, in cultivated field 150 feet south of U.S. Highway 76 and 150 feet west of paved county road.

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) loamy fine sand; weak medium granular structure; very friable; many fine roots; very strongly acid (pH 4.8); clear smooth boundary.

A2—8 to 12 inches, pale brown (10YR 6/3) fine sandy loam; few medium distinct yellowish brown (10YR 5/6) mottles; few fingers of Ap material; weak medium granular structure; very friable; common fine roots; strongly acid (pH 5.4); clear smooth boundary.

B1—12 to 16 inches, brownish yellow (10YR 6/6) fine sandy loam; few medium distinct strong brown (7.5YR 5/6) mottles and few fine pale brown mottles; weak medium subangular blocky structure; friable; common fine roots; very strongly acid (pH 4.8); clear smooth boundary.

B21t—16 to 30 inches, yellowish brown (10YR 5/6) fine sandy loam; common medium distinct pale brown (10YR 6/3) and strong brown (7.5YR 5/6) mottles, and few medium gray (10YR 6/1) mottles; weak medium subangular blocky structure; friable; few fine roots; sand grains coated and bridged with clay; patchy clay films on faces of peds; very strongly acid (pH 4.7) gradual wavy boundary.

B22t—30 to 45 inches, yellowish brown (10YR 5/6) sandy clay loam; common coarse distinct gray (10YR 6/1) mottles and common medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; patchy clay films on faces of peds; very strongly acid (pH 4.7); gradual wavy boundary.

B23t—45 to 58 inches, mottled yellowish brown (10YR 5/6) and gray (10YR 6/1) sandy clay loam; common medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; patchy clay films on faces of peds; few pockets of clean sand grains; very strongly acid (pH 4.8); gradual wavy boundary.

B24t—58 to 75 inches, coarsely mottled yellowish brown (10YR 5/6), gray (10YR 6/1), pale brown (10YR 6/3), and red (2.5YR 4/6) sandy clay loam; few pockets of sandy loam; weak medium subangular blocky structure; friable; sand grains coated and bridged with clay; very strongly acid (pH 4.8).

The solum is more than 60 inches thick. The A horizon is medium acid to very strongly acid, and the B horizon is strongly acid or very strongly acid.

The A horizon is 6 to 18 inches thick. The Ap horizon is 6 to 10 inches thick and is dark grayish brown, very dark grayish brown, or grayish brown. The A2 horizon, where present, is 3 to 9 inches of pale brown or light yellowish brown fine sandy loam, loamy sand, or loamy fine sand.

The B1 horizon, where present, is 3 to 10 inches of yellowish brown, brownish yellow, or light yellowish brown sandy loam or fine sandy loam commonly with mottles in shades of brown and yellow.

The B2t horizon is more than 40 inches thick and is sandy loam or sandy clay loam. The upper part is dominantly yellowish brown or brownish yellow, commonly with mottles in shades of yellow, brown, red, and gray. Mottles of chroma 2 or less are within 30 inches of the surface. The lower part of the B2t horizon is mottled with varying shades of brown, yellow, gray, and red.

GoA—Goldsboro loamy fine sand, 0 to 2 percent slopes. This soil is in broad areas of the uplands.

Included with this soil in mapping are small areas of Dothan, Duplin, Foreston, Dunbar, and Lynchburg soils. Small, depressed areas of Coxville and Rains soils are included and shown on the map by wet spot symbols. In few areas the soil is 5 to 20 percent nodules of plinthite within 60 inches of the surface. Also included are areas of soils with a loamy sand, sandy loam, and fine sandy loam surface layer.

Tilth is fairly good on this soil.

Most of this soil is in row crops. The principal crops are tobacco (fig. 3), cotton, corn, soybeans, and small grain. This soil usually needs drainage for the production of crops. Capability unit IIw-2; woodland group 2w8.

Hiwassee series

The soils of the Hiwassee series are nearly level and well drained. They formed in clayey sediments on terraces along the Great Pee Dee River.

In a typical profile the surface layer is dark reddish brown fine sandy loam about 6 inches thick. The subsoil is about 69 inches thick. In the upper 54 inches it is dark red firm clay; the next 6 inches is red friable clay loam; and the lower 9 inches is red friable sandy clay loam. The underlying material is about 5 inches of red sandy loam underlain by strong brown sand.

Hiwassee soils occur with Summerton, Cahaba, Persanti, Smithboro, and Cantey soils. Hiwassee soils have a darker red subsoil than Summerton and Cahaba soils. In addition, Hiwassee soils have a finer textured subsoil than Cahaba soils. Hiwassee soils are better drained than Persanti, Smithboro, and Cantey soils.

Hiwassee soils are low in organic matter. Permeability is moderate. Surface runoff is medium. Available water capacity is medium.

Representative profile of Hiwassee fine sandy loam 3 miles north of Pee Dee and 1 mile northwest of U.S. Highway 301, in cultivated field 200 feet west of dirt road.

Ap—0 to 6 inches, dark reddish brown (5YR 3/4) fine sandy loam; moderate medium granular structure; very friable; many fine roots; medium acid (pH 5.7); clear smooth boundary.

B21t—6 to 45 inches, dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm; common fine roots; common fine pores; thin continuous clay films on faces of peds; slightly acid (pH 6.3); gradual wavy boundary.

B22t—45 to 60 inches, dark red (2.5YR 3/6) clay; moderate medium angular and subangular blocky structure; firm; few fine pores; thin continuous clay films on faces of peds; few clean sand grains; strongly acid (pH 5.3); gradual wavy boundary.

B31—60 to 66 inches, red (2.5YR 4/6) clay loam; weak medium subangular blocky structure; friable; patchy clay films on faces of peds; few fine flakes of mica; very strongly acid (pH 4.8); clear wavy boundary.

B32—66 to 75 inches, red (2.5YR 4/8) sandy clay loam; weak medium subangular blocky structure; friable; patchy clay films on faces of peds; few fine flakes of mica; very strongly acid (pH 4.6); clear wavy boundary.

IIC1—75 to 80 inches, red (2.5YR 4/8) sandy loam; massive; friable; few fine flakes of mica; strongly acid (pH 5.3); clear wavy boundary.

IIIC2—80 to 90 inches, strong brown (7.5YR 5/8) sand; single grained; loose; common flakes of mica; common medium quartzite pebbles; strongly acid (pH 5.4).

The solum is more than 60 inches thick. The A horizon is slightly acid through strongly acid, and the B and C horizons are slightly acid through very strongly acid.

The Ap horizon is 5 to 9 inches thick.

The B1 horizon, where present, is 3 to 6 inches of dark red sandy clay loam.

The B2t horizon is commonly more than 45 inches thick. Texture of the B2t horizon is clay or clay loam.

The B3 horizon is 5 to 20 inches of clay loam or sandy clay loam. Color of the B3 horizon is red or yellowish red.

The C horizon occurs at a depth of more than 65 inches. The upper part is red or yellowish red, and the lower part is yellowish red, strong brown, or yellowish brown.

HwA—Hiwassee fine sandy loam, 0 to 2 percent slopes. This nearly level soil occurs on some of the higher stream terraces.

Included with this soil in mapping are small areas of Cahaba, Summerton, and Persanti soils. Also included are areas of soils that have a dark red sandy clay loam subsoil. There are a few small areas of 2 to 6 percent slopes. Some small depressed areas of wetter soils are shown on the map by wet spot symbols. A few small areas of this soil have a surface layer of sandy loam or loam.

This soil has fair to good tilth. Most of it is cultivated. The principal crops are tobacco, corn, soybeans, and cotton. Bahiagrass and Coastal bermudagrass are grown for hay and pasture. This soil has few limitations for crop production. Capability unit I-2; woodland group 3o7.

Johnston series

The soils of the Johnston series are nearly level and very poorly drained. They formed in stream deposits of loamy and sandy sediments. These soils are subject to stream overflow and are covered by standing water for long periods.

In a typical profile the surface layer is black fine sandy loam about 35 inches thick. The underlying material is dark gray fine sand.

Johnston soils occur with Rutlege, Paxville, and Osier soils. Johnston soils have a thicker black or very dark gray surface layer than any of these soils.

Johnston soils are high in organic matter. Permeability is moderately rapid to rapid. Surface runoff is very slow. Available water capacity is high.

Representative profile of Johnston fine sandy loam about 11 miles southeast of Marion and 1 1/4 miles northwest of the Little Pee Dee River, in a wooded area 200 feet south of U.S. Highway 501.

A11—0 to 20 inches, black (10YR 2/1) fine sandy loam; weak medium granular structure; friable; common fine and medium roots; very strongly acid (pH 4.5); gradual wavy boundary.

A12—20 to 35 inches, black (10YR 2/1) fine sandy loam; weak medium granular structure; friable; very strongly acid (pH 4.5); abrupt smooth boundary.

Cg—35 to 70 inches, dark gray (10YR 4/1) fine sand; single grained; loose; very strongly acid (pH 5.0).

The soil is strongly acid or very strongly acid throughout.

The A horizon is 25 to 50 inches thick. It is black, very dark gray, or very dark grayish brown. Texture of the A horizon includes mucky loam, loam, sandy loam, and fine sandy loam. In places the surface is covered with 6 to 8 inches of muck and undecomposed organic matter.

The C horizon is dark gray, gray, grayish brown, light brownish gray, or light gray. Texture of the C horizon includes sand, fine sand, or loamy sand. In some profiles the C horizon is stratified with sandy loam and sand.

JN—Johnston association, frequently flooded. These are nearly level Johnston soils and closely similar, very poorly drained soils that formed in loamy and sandy alluvial sediments along small streams and along the Lumber and Little Pee Dee Rivers. Johnston association, frequently flooded, was mapped at a lower intensity than most other mapping units in this survey. The intensity is adequate to meet the needs for which the survey is made.

Included in mapping are areas of Rutlege, Lumbee, Osier, Byars, and Paxville soils.

Most of these soils are in woodland of mixed hardwoods and pines. Most areas flood during heavy rains several times a year, mainly during the winter and early in spring, and water stands in some areas for long periods. These soils are suited to woodland but not crop production. Summer pastures can be grown under good management if the soils are protected from flooding. Capability unit VIIw-4; woodland group 1w9.

Kenansville series

The soils of the Kenansville series are nearly level to gently sloping and well drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is dark grayish brown sand about 8 inches thick. The subsurface layer is light yellowish brown sand about 17 inches thick. The subsoil is about 17 inches thick. The upper 13 inches is yellowish brown friable sandy loam, and the lower 4 inches of this layer is brownish yellow very friable loamy sand. The underlying material is brownish yellow and very pale brown sand.

Kenansville soils occur with Lakeland, Cahaba, Foreston, Centenary, and Eunola soils. Kenansville soils have a Bt horizon which Lakeland and Centenary soils do not have. Kenansville soils have a thicker surface horizon than Cahaba, Eunola, and Foreston soils, and they are better drained than Eunola, Centenary, and Foreston soils.

Kenansville soils are low in organic matter. Permeability is moderately rapid. Runoff is slow. Available water capacity is low.

Representative profile of Kenansville sand about 1 mile west of Nichols, in a cultivated field about 150 feet south of S.C. Secondary Road 30.

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) sand; weak fine granular structure; very friable; common fine roots; very strongly acid (pH 4.9); abrupt smooth boundary.

A2—8 to 25 inches, light yellowish brown (10YR 6/4) sand; weak fine granular structure; very friable; few fine roots; strongly acid (pH 5.1); clear wavy boundary.

B2t—25 to 38 inches, yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; friable; common fine pores; sand grains coated and bridged with clay; very strongly acid (pH 4.7); gradual wavy boundary.

B3—38 to 42 inches, brownish yellow (10YR 6/6) loamy sand; weak medium granular structure; very friable; clay coatings on sand grains; very strongly acid (pH 4.7); gradual wavy boundary.

C1—42 to 54 inches, brownish yellow (10YR 6/6) sand; common medium distinct pale brown (10YR 6/3) mottles; single grained; loose; very strongly acid (pH 4.8); gradual wavy boundary.

C2—54 to 75 inches, brownish yellow (10YR 6/6) and very pale brown (10YR 7/3) sand; single grained; loose; strongly acid (pH 5.4).

The solum is 40 to 55 inches thick. The A horizon is medium acid through very strongly acid, and the B and C horizons are strongly acid or very strongly acid.

Thickness of the A horizon ranges from 21 to 32 inches. The Ap horizon is 6 to 10 inches thick and is dark grayish brown or grayish brown. The A2 horizon is 13 to 23 inches thick and is yellowish brown, pale brown, or light yellowish brown.

The B2t horizon is 9 to 28 inches thick and is yellowish brown or strong brown.

The B3 horizon, where present, is 4 to 10 inches thick.

The C horizon is 40 to 55 inches from the surface. It is brownish yellow, pale brown, light gray, or gray, or is mottled with these colors. The gray and light gray occur at depths of 60 inches or more. Texture of the C horizon is sand or loamy sand.

KnB—Kenansville sand, 0 to 4 percent slopes. This soil is nearly level to gently sloping and occurs on broad upland ridges and on some of the higher stream terraces.

Included with this soil in mapping are small areas of Lakeland, Fuquay, Cahaba, and Blanton soils. Also included are some small wet areas that are shown on the map by wet spot symbols. There are a few inclusions of soils with redder colors in the subsoil and a few of soils with 4 to 6 percent slopes.

This soil has good tilth and can be cultivated over a wide moisture range.

Most of this soil is in crops or pasture. The principal crops are cotton, tobacco, corn, soybeans, Coastal bermudagrass, or bahiagrass. This soil is slightly droughty during periods of low rainfall. Wind erosion is a hazard in large unprotected areas. Stripcropping, windbreaks, and cropping systems that keep crop residues on the surface are used to control erosion and maintain the content of organic matter in this soil. Capability unit IIs-1; woodland group 3s2.

Lakeland series

The soils of the Lakeland series are nearly level to sloping and are excessively drained. They formed in sandy Coastal Plain sediments.

In a typical profile the surface layer is dark brown sand about 6 inches thick. The underlying material is sand to a depth of 80 inches or more. The upper 54 inches is yellowish brown, and the lower 20 inches is brownish yellow with common uncoated sand grains.

Lakeland soils occur with Blanton, Fuquay, Pocalla, Kenansville, Centenary, Rutlege, Osier, and Rains soils. Lakeland soils differ from Blanton, Fuquay, Pocalla, Kenansville, and Rains soils in that they are coarser textured and do not have a Bt horizon. Lakeland soils are better drained than Centenary, Rutlege, Osier, and Rains soils.

Lakeland soils are low in organic matter. Permeability is very rapid. Runoff is slow. Available water capacity is low.

Representative profile of Lakeland sand about 5 miles north of Marion, in an open field 0.9 mile north of intersection of U.S. Highway 501 and S.C. Secondary Road 23, and 500 feet west of Secondary Road 23.

Ap—0 to 6 inches, dark brown (10YR 3/3) sand; single grained; loose; common fine roots; very strongly acid (pH 4.5); clear wavy boundary.

C1—6 to 28 inches, yellowish brown (10YR 5/6) sand; single grained; loose; few fine roots; few uncoated sand grains; strongly acid (pH 5.1); gradual wavy boundary.

C2—28 to 60 inches, yellowish brown (10YR 5/8) sand; single grained; loose; few fine roots; few uncoated sand grains; strongly acid (pH 5.2); gradual wavy boundary.

C3—60 to 80 inches, brownish yellow (10YR 6/8) sand; single grained; loose; common uncoated sand grains; strongly acid (pH 5.2).

This soil is medium acid through very strongly acid throughout.

Texture ranges from coarse sand to fine sand throughout the profile, but 5 to 10 percent silt plus clay is in the 10- to 40-inch section of the C horizon. Depth of the sand exceeds 80 inches.

The A horizon is 6 to 9 inches thick and is dark grayish brown, dark brown, grayish brown, or brown.

The upper part of the C horizon is commonly yellowish brown, brownish yellow, or strong brown. The lower part is brownish yellow, yellow, light yellowish brown, pale brown, or very pale brown.

LaB—Lakeland sand, 0 to 6 percent slopes. This nearly level to gently sloping soil occurs on broad ridges of the uplands and on the higher river terraces.

Included with this soil in mapping are small areas of Blanton, Kenansville, Pocalla, Centenary, and Fuquay soils. Also included are some areas of soils that have a sand surface layer and a loamy sand subsoil. Some small depressional areas of wet soils are shown on the map by wet spot symbols. A few areas of included soils have 6 to 10 percent slopes. Also included are a few areas of soils on terraces of the Little Pee Dee and Lumber Rivers that have light gray to white sand below about 45 inches.

This soil is easily tilled over a wide range of moisture conditions.

About 50 percent of this soil is in row crops or pasture. The rest is in woodland. The principal cultivated crops include corn, soybeans, peanuts, and watermelons. Some cotton and tobacco are also grown. Pasture and hay crops are Coastal bermudagrass, bahiagrass, and sericea lespedeza. This soil is droughty. Wind erosion is a hazard on some of the larger cultivated fields.

Fertilizers are more efficient when applied in split applications on this soil. Cropping systems that produce large amounts of residue are needed to maintain the organic-matter content. Stripcropping with the strips at right angles to the prevailing winds is needed to control wind erosion. Rye is excellent to use in stripcropping systems on this soil. Capability unit IVs-1; woodland group 4s2.

Leon series

The soils of the Leon series are nearly level and poorly drained. They formed in sandy Coastal Plain sediments.

In a typical profile the surface layer is black sand about 5 inches thick with many clean white sand grains. The subsurface layer is light gray sand about 17 inches thick. The subsoil is about 12 inches of weakly cemented, organic-coated material: the upper 9 inches is very dark brown loamy sand, and the lower 3 inches is black sand. Below this layer is 8 inches of gray sand. The next layer is sand to a depth of 60 inches: the upper 6 inches is very dark brown with brown mottles, and the lower 12 inches is dark brown with dark grayish brown mottles.

Leon soils occur with Lakeland, Centenary, Foreston, Pantego, Osier, Rutlege, and Lynn Haven soils. Leon soils are more poorly drained than Lakeland, Centenary, and Foreston soils. Leon soils have an organic hardpan in the Bh horizon and Pantego, Osier, and Rutlege soils do not. Leon soils have a thinner dark surface layer than Lynn Haven soils.

Leon soils are low in organic matter. Permeability is rapid in the surface and subsurface horizon and moderate to moderately rapid in the organic hardpan horizon. Surface runoff is slow. Available water capacity is low to very low.

Representative profile of Leon sand about 6 1/2 miles northeast of Marion, 1 1/4 miles northwest of S.C. Highway 41A, in woods on northeast rim of Ten Mile Bay.

A1—0 to 5 inches, black (10YR 2/1) sand; weak fine granular structure; very friable; many fine and medium roots; many clean sand grains have a salt-and-pepper appearance; extremely acid (pH 4.2); clear smooth boundary.

A2—5 to 22 inches, light gray (10YR 7/1) sand; single grained; loose; many fine and medium roots; strongly acid (pH 5.5); clear wavy boundary.

B21h—22 to 31 inches, very dark brown (10YR 2/2) loamy sand; weak fine granular structure; friable; weakly cemented; common fine and medium roots; most sand grains have organic coatings; very strongly acid (pH 4.5); clear wavy boundary.

B22h—31 to 34 inches, black (10YR 2/1) sand; weak medium subangular blocky structure; friable and slightly brittle; weakly cemented; common fine roots; most sand grains have organic coatings; extremely acid (pH 4.2); clear wavy boundary.

A'2—34 to 42 inches, gray (10YR 6/1) sand; common medium faint grayish brown (10YR 5/2) mottles; single grained; loose; many uncoated sand grains; strongly acid (pH 5.1); clear wavy boundary.

B'21h—42 to 48 inches, very dark brown (10YR 2/2) sand; common medium distinct brown (10YR 4/3) mottles; single grained; loose; extremely acid (pH 4.4); gradual wavy boundary.

B'22h—48 to 60 inches, dark brown (7.5YR 3/2) sand; common medium faint dark grayish brown (10YR 4/2) mottles; single grained; loose; very strongly acid (pH 4.8)).

These soils are strongly acid to extremely acid throughout.

The A horizon commonly is 10 to 24 inches thick. The A1 horizon is 4 to 8 inches thick. The A2 horizon is 4 to about 18 inches thick. It is gray, light gray, dark gray, or light brownish gray.

The B2h horizon is sand or loamy sand and ranges in thickness from about 7 to 20 inches. It is black, very dark brown, dark brown, dark reddish brown, or very dark grayish brown.

Some profiles have a Bh and B3 horizon that is 5 to 10 inches of sand. Color of this horizon is dominantly dark brown, brown, very dark grayish brown, very dark gray, or black.

Some profiles have a B3 horizon of sand that is dark brown or brown with mottles in shades of gray, yellow, and brown.

The A'2 horizon, where present, is 6 to 18 inches of gray, light gray, grayish brown, or light brownish gray.

The B'2h horizon, where present, is 10 to 24 inches thick. It is dominantly black, very dark brown, dark brown, dark reddish brown, or very dark grayish brown.

Some profiles have a C horizon of sand below the upper Bh horizon that extends to a depth of 72 inches or more. The C horizon is commonly gray, light gray, grayish brown, light brownish gray, or brown.

Le—Leon sand. This soil is nearly level and occurs on upland flats, in shallow depressions or bays, on rims of some larger bays, and on low terraces along the Little Pee Dee and Lumber Rivers.

Included with this soil in mapping are a few areas of Rutlege, Osier, Lynn Haven, and Centenary soils. Also included are a few areas of soils that have an organic hardpan directly beneath the surface layer.

Most of this soil is in woodland. A few areas have been cleared and are planted to corn and soybeans. The organic hardpan limits root development and water movement, and makes this soil generally unsuited for crop production. Capability unit IVw-4; woodland group 4w2.

Lumbee series

The soils of the Lumbee series are nearly level and poorly drained. They formed in loamy deposits on low stream terraces.

In a typical profile the surface layer is about 7 inches of very dark gray sandy loam. The subsoil is 30 inches thick. The upper 14 inches is grayish brown friable sandy clay loam with light yellowish brown and yellowish brown mottles; the next 10 inches is gray friable sandy clay loam with reddish yellow mottles; and the lower 6 inches is light gray and gray very friable fine sandy loam. The underlying material is light gray sand.

Lumbee soils occur with Lakeland, Cahaba, Centenary, Eunola, Smithboro, Cantey, and Paxville soils. Lumbee soils are more poorly drained than Lakeland, Cahaba, Centenary, Eunola, and Smithboro soils. Lumbee soils have a coarser textured subsoil than Cantey soils, and they have a thinner dark surface layer than Paxville soils.

Lumbee soils are moderate in organic matter. Permeability is moderate. Surface runoff is slow. Available water capacity is medium.

Representative profile of Lumbee sandy loam 1.5 miles north of Nichols in cultivated field 0.4 mile east of S.C. Highway 9.

Ap—0 to 7 inches, very dark gray (10YR 3/1) sandy loam, weak medium granular structure; very friable; common fine and medium roots; very strongly acid (pH 5.0); abrupt smooth boundary.

B21tg—7 to 21 inches, grayish brown (10YR 5/2) sandy clay loam; common medium distinct light yellowish brown (10YR 6/4) mottles and common fine distinct yellowish brown mottles; weak, medium subangular blocky structure; friable; few fine roots; patchy clay films on faces of peds and in pores; very strongly acid (pH 4.7); gradual wavy boundary.

B22tg—21 to 31 inches, gray (10YR 6/1) sandy clay loam; common medium distinct reddish yellow (7.5YR 7/8) mottles; weak medium subangular blocky structure; friable; few fine roots; patchy clay films on faces of peds and in pores; very strongly acid (pH 4.7); gradual wavy boundary.

B3g—31 to 37 inches, mottled light gray (10YR 7/2) and gray (10YR 5/1) fine sandy loam; weak medium subangular blocky structure; very friable; most sand grains coated and bridged with clay; very strongly acid (pH 4.6); clear wavy boundary.

IICg—37 to 72 inches, light gray (10YR 7/2) sand; single grained, loose; strongly acid (pH 5.3).

The solum is 25 to 40 inches thick. These soils are strongly acid or very strongly acid throughout.

The A horizon is 6 to 14 inches thick. The A1 or Ap horizon is 4 to 8 inches thick and is dark gray, very dark gray, or black. The A2 horizon, where present, is 2 to 8 inches of gray, light gray, or light brownish gray sandy loam or fine sandy loam.

Some profiles have a B1 horizon that is 2 to 6 inches thick and is dominantly gray, light gray, light brownish gray, or grayish brown sandy loam or fine sandy loam.

The B2t horizon is 12 to 30 inches thick. It is dominantly gray, light gray, grayish brown, or light brownish gray with few to common mottles in shades of yellow and brown. Texture of the B2t horizon is sandy loam or sandy clay loam.

The B3 horizon is 4 to 10 inches thick. It is gray or light gray with none to few mottles in shades of yellow and brown.

The C horizon is gray or light gray sand or loamy sand.

Lm—Lumbee sandy loam. This soil is nearly level and occurs in broad, low areas or depressions on low stream terraces.

Included with this soil in mapping are small areas of Paxville, Cantey, Osier, and Rutlege soils. Also included are some areas of soils that have a solum 40 to 50 inches thick. Some areas of soils have a loamy sand or fine sandy loam surface layer.

About 85 percent of this soil is in woodland. The rest is cropland or pasture. The principal crops are corn, soybeans, and pasture grasses. Extensive drainage systems are required when this soil is used for crops, and drainage is also needed for improved pastures. Capability unit IIIw-4; woodland group 2w9.

Lynchburg series

The soils of the Lynchburg series are nearly level and somewhat poorly drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is dark gray sandy loam about 7 inches thick. The subsoil extends to a depth of 72 inches. The upper 13 inches is mottled yellowish brown and grayish brown friable sandy clay loam with red mottles; the next 44 inches is mottled gray friable sandy clay loam; and the lower 8 inches is mottled dark gray firm sandy clay loam.

The Lynchburg soils occur with Dothan, Goldsboro, Dunbar, Coxville, Rains, and Pantego soils. Lynchburg soils are more poorly drained than Dothan and Goldsboro soils. They are better drained than Coxville, Rains, and Pantego soils. Lynchburg soils have a coarser textured subsoil than Dunbar soils.

Lynchburg soils are moderate in organic matter. Permeability is moderate. Surface runoff is slow. Available water capacity is medium.

Representative profile of Lynchburg sandy loam about 3 miles southwest of Mullins, 150 feet south of county road in cultivated field between south ends of Little Sister and Big Sister Bays.

Ap—0 to 7 inches, dark gray (10YR 4/1) sandy loam; weak fine granular structure; very friable; many fine roots; slightly acid (pH 6.5); abrupt smooth boundary.

B1—7 to 9 inches, mottled yellowish brown (10YR 5/6) and pale brown (10YR 6/3) sandy loam; common medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; common fine roots; many fine pores; strongly acid (pH 5.1); clear smooth boundary.

B21t—9 to 20 inches, mottled yellowish brown (10YR 5/8) and grayish brown (10YR 5/2) sandy clay loam; common medium prominent red (2.5YR 4/8) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; thin patchy clay films on faces of peds; strongly acid (pH 5.1); gradual wavy boundary.

B22tg—20 to 40 inches, gray (10YR 5/1) sandy clay loam; many medium distinct yellowish brown (10YR 5/8) mottles, common medium prominent red (2.5YR 4/8) mottles, and few medium faint dark gray (10YR 4/1) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; thin patchy clay films on faces of peds; strongly acid (pH 5.1); gradual wavy boundary.

B23tg—40 to 50 inches, gray (10YR 5/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/6) mottles and few medium prominent red (10YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine pores; thin patchy clay films on faces of peds; very strongly acid (pH 5.0); gradual wavy boundary.

B31g—50 to 64 inches, gray (10YR 5/1) sandy clay loam; many coarse distinct yellowish brown (10YR 5/6) mottles and few medium prominent dark red (2.5YR 3/6) mottles; weak medium and coarse subangular blocky structure; friable; thin patchy clay films on faces of peds; strongly acid (pH 5.1); gradual wavy boundary.

B32g—64 to 72 inches, dark gray (10YR 4/1) sandy clay loam; common medium distinct yellow (10YR 7/6) and yellowish brown (10YR 5/6) mottles; very weak medium subangular blocky structure to massive; firm; strongly acid (pH 5.5).

Thickness of the solum is 60 to more than 72 inches. The A horizon is slightly acid through very strongly acid, and the B horizon is strongly acid or very strongly acid.

The A horizon is 6 to 14 inches thick. The Ap or A1 horizon is 6 to 8 inches thick and is dark gray, very dark gray, or dark grayish brown. The A2 horizon, where present, is 3 to 6 inches of pale brown or brown loamy sand or sandy loam.

The B1 horizon, where present, is 2 to 11 inches of mottled yellowish brown, brownish yellow, pale brown, brown, or light gray sandy loam or fine sandy loam.

The B2t horizon is 40 to more than 50 inches thick. In the upper part it is mottled yellowish brown, brownish yellow, light yellowish brown, or pale brown, with mottles in varying shades of red, yellow, gray, and brown. Mottles with chroma 2 or less occur in the upper 10 inches of the B2t horizon. The lower part of the B2t horizon has dominantly gray colors with common to many mottles of red, yellow, and brown. Texture of the B2t horizon is sandy clay loam or sandy loam.

The B3 horizon is 8 to 25 inches thick. It has dominantly gray or dark gray colors with mottles in shades of red, yellow, and brown. Texture is sandy loam, sandy clay loam, or clay loam.

Ln—Lynchburg sandy loam. This soil is nearly level and occurs in broad areas.

Included with this soil in mapping are small areas of Goldsboro, Dunbar, Foreston, and Eunola soils. Small wet depressed areas are included and are shown on the map by wet spot symbols. Also included are areas of soils with a loamy sand and fine sandy loam surface layer.

About 50 percent of this soil is cultivated. The rest is in woodland. Tilth is generally good. Drainage is needed for the production of crops. Principal crops are tobacco, cotton, corn, soybeans, and small grain. Capability unit IIw-2; woodland group 2w8.

Lynn Haven series

The soils of the Lynn Haven series are nearly level and poorly drained. They formed in sandy Coastal Plain sediments.

In a typical profile the surface layer is black sand about 11 inches thick. The subsurface layer is grayish brown sand about 3 inches thick. The subsoil is about 18 inches thick: the upper 6 inches is black, slightly brittle, weakly cemented loamy sand; and the lower 12 inches is dark reddish brown friable loamy sand. The underlying material is dark grayish brown and dark reddish brown sand.

Lynn Haven soils occur with Lakeland, Centenary, Foreston, Pantego, Osier, Rutlege, and Leon soils. Lynn Haven soils are more poorly drained than Lakeland, Centenary, and Foreston soils. Lynn Haven soils have a spodic horizon and Pantego, Osier, and Rutlege soils do not. Lynn Haven soils have a thicker dark surface layer than Leon soils.

Lynn Haven soils are moderate in organic matter. Permeability is moderate to moderately rapid. Runoff is slow. The water table is at or near the surface for long periods of the year. Available water capacity is low to very low.

Representative profile of Lynn Haven sand about 4 1/4 miles southeast of Marion, 1,500 feet northwest of the intersection of S.C. Secondary Road 39 and Reedy Creek, in woods 200 feet northeast of S.C. Secondary Road 39.

A1—0 to 11 inches, black (10YR 2/1) sand; weak fine granular structure; very friable; common fine and medium roots; extremely acid (pH 3.9); clear wavy boundary.

A2—11 to 14 inches, grayish brown (10YR 5/2) sand; many medium faint gray (10YR 6/1) mottles; single grained; loose; common fine and medium roots; many uncoated sand grains; extremely acid (pH 4.4); abrupt wavy boundary.

B21h—14 to 20 inches, black (5YR 2/1) loamy sand; weak fine granular structure; slightly brittle, weakly cemented; common fine and medium roots; many uncoated sand grains; extremely acid (pH 4.2); clear wavy boundary.

B22h—20 to 32 inches, dark reddish brown (5YR 2/2) loamy sand; friable; common fine and medium roots; many sand grains are coated with organic matter; few small pockets of uncoated sand grains; very strongly acid (pH 4.5); clear wavy boundary.

C&B23h—32 to 70 inches, dark grayish brown (10YR 4/2) and dark reddish brown (5YR 2/2) sand; single grained; loose; very strongly acid (pH 4.7).

These soils range from strongly acid through extremely acid throughout. Beneath the A horizon, to a depth of 70 inches or more, is fine sand, sand, or loamy sand.

The A horizon commonly is 12 to 20 inches thick. The A1 horizon is 8 to 14 inches thick. The A2 horizon is 2 to about 10 inches of grayish brown, light brownish gray, gray, or light gray.

The Bh horizon ranges in thickness from about 6 to 20 inches. It is black, dark reddish brown, very dark brown, or dark brown.

Some profiles have a C and Bh horizon of mostly gray, light brownish gray, grayish brown, or dark grayish brown C horizon material and dark reddish brown, very dark brown, or dark brown Bh horizon material.

Some profiles have a B3 horizon that is pale brown, brown, dark brown, or dark yellowish brown.

The C horizon, where present, is gray, light brownish gray, grayish brown, or dark grayish brown.

Ly—Lynn Haven sand. This soil is nearly level and occurs in shallow depressions or bays, on upland flats, and bordering small streams and drainageways.

Included with this soil in mapping are a few areas of Rutlege, Osier, Pantego, and Leon soils. Also included are a few areas of soils in which the brittle, cemented layer is directly beneath the surface layer. A few areas have soils with a sandy loam or sandy clay loam horizon below the spodic horizon.

Most of this soil is in woodland. This soil is generally unsuited to row crops. Areas used for pasture must be drained intensively. Capability unit Vw-5; woodland group 4w3.

Osier series

The soils of the Osier series are nearly level and poorly drained. They formed in sandy Coastal Plain sediments.

In a typical profile the surface layer is about 5 inches of black loamy sand. The underlying material is sand to a depth of 70 inches or more. In the upper 22 inches it is light brownish gray with grayish brown mottles; the next 8 inches is gray; and the lower 35 inches is light brownish gray.

Osier soils occur with Lakeland, Blanton, Centenary, Lynchburg, Rains, Paxville, and Rutlege soils. Osier soils are more poorly drained than Lakeland, Blanton, Centenary, and Lynchburg soils. Osier soils lack the argillic horizon which occurs in Blanton, Lynchburg, Rains, and Paxville soils. Osier soils have a thinner dark surface layer than Paxville and Rutlege soils.

Osier soils are low in organic matter. Permeability is rapid. Runoff is very slow. Available water capacity is very low.

Representative profile of Osier loamy sand about 9 1/4 miles northeast of Marion, in woods about 250 feet northwest of a dirt road which intersects S.C. Secondary Road 22, 1,900 feet to the northeast. This intersection is 1,600 feet west-northwest of the intersection of S.C. Secondary Roads 22 and 44.

A1—0 to 5 inches, black (10YR 2/1) loamy sand; weak fine granular structure; very friable; common fine and medium roots; very strongly acid (pH 4.5); abrupt wavy boundary.

C1g—5 to 27 inches, light brownish gray (10YR 6/2) sand; common medium faint grayish brown (10YR 5/2) mottles; single grained, loose; few fine roots; strongly acid (pH 5.4); gradual wavy boundary.

C2g—27 to 35 inches, gray (10YR 6/1) sand; single grained, loose; strongly acid (pH 5.5); gradual wavy boundary.

C3g—35 to 70 inches, light brownish gray (10YR 6/2) sand; single grained, loose; strongly acid (pH 5.3).

These soils are medium acid to very strongly acid throughout.

The A horizon is 4 to 8 inches of black, very dark gray, or dark gray.

The C horizon is dominantly gray, light gray, light brownish gray, or grayish brown. Some profiles have mottles in shades of yellow and brown. Some profiles have thin strata of loamy sand or sandy loam, commonly at a depth of 40 to 50 inches.

Os—Osier loamy sand. This soil is nearly level and occurs in low wet areas at the heads of and along small streams and drainageways and in some oval-shaped depressions.

Included with this soil in mapping are small areas of Rutlege, Paxville, Rains, Lumbee, and Leon soils. Also included are a few areas of soils that have a fragipan horizon at depths between 40 and 60 inches. Some areas have a sand or loamy fine sand surface layer.

This soil has a high water table Ponding and flooding commonly occur in most areas.

Most of this soil is in woodland. A few areas are in pasture. It is generally unsuited to row crops, and areas used for pasture must be drained intensively. Capability unit Vw-2; woodland group 3w3.

Pantego series

The soils of the Pantego series are nearly level and very poorly drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is about 12 inches of black loam. The subsoil is friable sandy clay loam to a depth of 72 inches. In the upper 24 inches it is dark gray with very dark gray mottles; the next 19 inches is gray with dark grayish brown and very dark gray mottles; and the lower 17 inches is gray with dark gray mottles.

Pantego soils occur with Lynchburg, Goldsboro, Dothan, Coxville, Rains, and Rutlege soils. Pantego soils are more poorly drained and have a thicker black surface layer than Lynchburg, Goldsboro, Dothan, Coxville, and Rains soils. Pantego soils are finer textured throughout than Rutlege soils.

Pantego soils are high in organic matter. Permeability is moderate, and surface runoff is ponded to very slow. Available water capacity is medium to high.

Representative profile of Pantego loam about 5 1/2 miles east of Marion, 1 3/4 miles south of U.S. Highway 76, in a pasture about 2,100 feet east of S.C. Secondary Road 202 and 250 feet south of dirt road.

Ap—0 to 12 inches, black (10YR 2/1) loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid (pH 5.3); gradual wavy boundary.

B21tg—12 to 36 inches, dark gray (10YR 4/1) sandy clay loam; common medium faint very dark gray (10YR 3/1) mottles; weak fine subangular blocky structure; friable; few fine roots; common fine pores; thin patchy clay films on faces of peds; very strongly acid (pH 4.5); gradual wavy boundary.

B22tg—36 to 55 inches, gray (10YR 5/1) sandy clay loam; common medium distinct dark grayish brown (10YR 4/2) mottles and few medium distinct very dark gray (10YR 3/1) mottles; weak fine and medium subangular blocky structure; friable; few fine pores; thin patchy clay films on faces of peds; extremely acid (pH 4.4); gradual smooth boundary.

B3g—55 to 72 inches, gray (10YR 6/1) sandy clay loam; common medium distinct dark gray (10YR 4/1) mottles; weak coarse subangular blocky structure; friable; thin patchy clay films on faces of peds; extremely acid (pH 4.4).

The solum is more than 60 inches thick. The entire profile is strongly acid through extremely acid.

The A horizon is 12 to 19 inches thick. It is black or very dark gray.

The B1 horizon, where present, is about 4 to 8 inches of dark gray sandy loam.

The B2t horizon is 40 to more than 60 inches thick. It is gray, dark gray, or light gray. Some profiles have a few mottles in shades of yellow and brown. Texture of the B2t horizon is sandy loam, sandy clay loam, or clay loam.

The B3 horizon is 5 to 20 inches of sandy loam, sandy clay loam, or clay loam. It is gray or light gray.

Pa—Pantego loam. This soil is nearly level and occurs in slightly depressional areas, along drainageways, in oval-shaped bays, and at the heads of streams.

Some mapped areas of this soil have inclusions of small areas of Rains, Paxville, Coxville, Osier, and Rutlege soils. There are some areas of soils that have a fragipan. Some areas have soils with a sandy loam or fine sandy loam surface layer.

Tilth is fair on this soil.

Most of this soil is in woodland. Where the soil has been cleared, the principal crops are corn, soybeans, oats, and pasture grasses. Extensive drainage systems are required for the production of crops. Capability unit IIIw-4; woodland group 1w9.

Paxville series

The soils of the Paxville series are nearly level and very poorly drained. They formed in loamy Coastal Plain sediments, mainly on low river terraces.

In a typical profile the surface layer is about 18 inches thick: the top 12 inches is black loam, and the lower 6 inches is very dark gray fine sandy loam. The subsoil is about 24 inches thick. In the upper 8 inches it is dark gray friable sandy clay loam; the next 10 inches is gray friable sandy clay loam; and the lower 6 inches is very dark gray and dark gray very friable fine sandy loam. The underlying material is grayish brown sand.

Paxville soils occur with Cahaba, Eunola, Centenary, Lumbee, Byars, and Rutlege soils. Paxville soils are more poorly drained than Cahaba, Eunola, and Centenary soils. Paxville soils have a thicker dark surface layer than Lumbee soils. Paxville soils have a coarser textured subsoil than Byars soils and a finer textured subsoil than Rutlege soils.

Paxville soils are high in organic matter. Permeability is moderate. Surface runoff is very slow. Available water capacity is medium to high.

Representative profile of Paxville loam about 3 1/4 miles southeast of Mullins, 1/2 mile southeast of S.C. Secondary Road 31, in woodland area 100 feet east of Red Bluff Road.

A11—0 to 12 inches, black (N 2/0) loam; weak medium granular structure; very friable; many fine and medium and a few large roots; extremely acid (pH 3.8); clear smooth boundary.

A12—12 to 18 inches, very dark gray (10YR 3/1) fine sandy loam; weak medium granular structure; very friable; common fine and medium roots; extremely acid (pH 4.2); clear wavy boundary.

B21tg—18 to 26 inches, dark gray (10YR 4/1) sandy clay loam; weak medium subangular blocky structure; friable; common fine roots and pores; thin patchy clay films on faces of peds; extremely acid (pH 4.3); gradual wavy boundary.

B22tg—26 to 36 inches, gray (10YR 5/1) sandy clay loam; few medium faint dark gray (10YR 4/1) mottles; weak medium subangular blocky structure; friable; few fine roots; thin patchy clay films on faces of peds; extremely acid (pH 4.4); gradual wavy boundary.

B3g—36 to 42 inches, very dark gray (10YR 3/1) and dark gray (10YR 4/1) fine sandy loam; weak medium granular structure; very friable; few fine flakes of mica; few pockets of sandy clay loam; extremely acid (pH 4.4); abrupt smooth boundary.

Cg—42 to 72 inches, grayish brown (10YR 5/2) sand; single grained, loose; few fine flakes of mica; very strongly acid (pH 4.9).

The solum ranges from about 35 to 45 inches thick. The soil is strongly acid through extremely acid throughout.

The A horizon is 10 to 18 inches thick. It is black, very dark gray, or very dark grayish brown.

Some profiles have a 3 to 5 inch B1 horizon that is gray, dark gray, or very dark gray sandy loam.

The B2t horizon is about 16 to 26 inches thick. It is gray, dark gray, very dark gray, dark grayish brown, or light brownish gray. Some profiles have mottles in shades of yellow or brown. Texture of the B2t horizon includes sandy loam, sandy clay loam, or clay loam.

The B3 horizon, where present, is 3 to 6 inches thick. It is gray, dark gray, or very dark gray fine sandy loam, sandy loam, loamy sand, or sand. A few mottles in shades of yellow or brown occur in this horizon in some profiles.

The C horizon is grayish brown, light brownish gray, gray, or light gray.

These soils occur mainly on a river terrace. They have a thinner solum than that defined as the range for the Paxville series. This does not alter their behavior, use, or management.

Pb—Paxville loam. This soil is nearly level and occurs on broad, flat, slightly depressed areas, in oval-shaped bays, and along small streams and drainageways.

Included with this soil in mapping are small areas of Lumbee, Rutlege, Osier, and Byars soils. Some areas have soils with a solum 30 to 40 inches thick. Also included are areas of soils with a sandy loam or fine sandy loam surface layer.

Most of this soil is in woodland. Some areas have been cleared and are in corn, soybeans, or pasture. Extensive drainage systems are required for the production of crops. Capability unit IIIw-4; woodland group 1w9.

Persanti series

The soils of the Persanti series are nearly level to gently sloping and moderately well drained. They formed in clayey Coastal Plain sediments.

In a typical profile the surface layer is dark gray fine sandy loam about 5 inches thick. The subsurface layer is 3 inches of pale brown fine sandy loam. The subsoil extends to a depth of 75 inches and is firm clay. In the upper 15 inches it is yellowish brown with brownish yellow mottles; the next 39 inches is mottled yellowish brown, strong brown, red, and gray; and the lower 13 inches is gray with brownish yellow and red mottles.

Persanti soils occur with Summerton, Varina, Dothan, Duplin, Dunbar, Smithboro, Cantey, and Coxville soils. Persanti soils are not as well drained as the Summerton, Varina, and Dothan soils. Persanti soils have more clay in the subsoil than Duplin soils. They are better drained than Dunbar, Smithboro, Cantey, and Coxville soils.

Persanti soils are low in organic matter. Permeability is slow. Surface runoff is medium. Available water capacity is medium.

Representative profile of Persanti fine sandy loam about 2 1/2 miles southwest of Marion, 1/2 mile southwest of intersection of S.C. Secondary Roads 25 and 34, in wooded area 200 feet southeast of S.C. Secondary Road 25.

A1—0 to 5 inches, dark gray (10YR 4/1) fine sandy loam; weak fine granular structure; very friable; many fine and medium roots; very strongly acid (pH 4.7); clear wavy boundary.

A2—5 to 8 inches, pale brown (10YR 6/3) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; strongly acid (pH 5.1); abrupt smooth boundary.

B21t—8 to 23 inches, yellowish brown (10YR 5/4) clay; common medium distinct brownish yellow (10YR 6/8) mottles; moderate medium angular and subangular blocky structure; firm; few fine and medium roots; common fine pores; thin continuous clay films on faces of peds; strongly acid (pH 5.4); gradual wavy boundary.

B22t—23 to 36 inches, mottled yellowish brown (10YR 5/8), strong brown (7.5YR 5/8), and red (2.5YR 4/8) clay; common medium distinct gray (10YR 6/1) mottles; strong medium angular and subangular blocky structure; firm; thick continuous clay films on faces of peds; strongly acid (pH 5.5); gradual wavy boundary.

B23t—36 to 62 inches, mottled yellowish brown (10YR 5/8), strong brown (7.5YR 5/8), red (2.5YR 4/8), and gray (10YR 6/1) clay;

moderate medium subangular blocky structure; firm; thin continuous clay films on faces of peds; strongly acid (pH 5.4); gradual wavy boundary.

B3—62 to 75 inches, gray (10YR 6/1) clay; common medium distinct brownish yellow (10YR 6/8) mottles and common medium prominent red (10R 4/6) mottles; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; strongly acid (pH 5.5).

The solum is 60 inches or more thick. The A horizon is medium acid through very strongly acid, and the B horizon is strongly acid or very strongly acid.

Total thickness of the A horizon ranges from 6 to 10 inches. The 4 to 9 inch Ap or A1 horizon is grayish brown, brown, dark gray, or dark grayish brown. The A2 horizon, where present, is 2 to 4 inches thick and is commonly pale brown or light yellowish brown.

The B1 horizon, where present, is 2 to 6 inches of clay loam or sandy clay loam. It is light yellowish brown, yellowish brown, and light olive brown.

The B2t horizon is more than 40 inches thick. It is clay or silty clay and may include thin layers of silty clay loam. The upper B2t horizon has a matrix color of yellowish brown, brownish yellow, light olive brown, or strong brown. The top 8 to 12 inches of the B2t horizon is commonly mottle-free, but may have few to common mottles in varying shades of yellow, brown, or red. The lower part of the B2t horizon is mottled with varying shades of gray, yellow, brown, and red or it is gray with red and brown mottles. Mottles of chroma 2 or less occur at 15 to 30 inches from the surface. Some profiles have few to common flakes of mica in the lower B2t horizon.

The B3 horizon, where present, is mottled with gray, yellow, brown, and red or is dominantly gray with yellow, brown, and red mottles. It is clay or clay loam.

In most areas mapping unit PeB is outside the range defined for the Persanti series because it has more than a 20 percent clay decrease at a depth of about 50 to 60 inches. Interpretations are the same as for the Persanti series.

PeA—Persanti fine sandy loam, 0 to 2 percent slopes. This soil has the profile described as representative of the series. This nearly level soil is on broad areas of stream terraces and upland areas.

Included with this soil in mapping are small areas of Varina, Summerton, Duplin, Dunbar, and Smithboro soils. Some included small areas of soils have slopes of 2 to 4 percent. Also included are small depressional areas of poorly drained soils that are shown on the map by wet spot symbols. There are some areas of soils with more than a 20 percent clay decrease at 45 to 60 inches from the surface. A few areas include soils with a loam, sandy loam, or loamy fine sand surface layer.

This soil has moderately good tilth. However, it cannot be cultivated when wet without clodding.

About 65 percent of this soil is in crops or pasture. The rest is in woodland. The principal crops are tobacco, corn, soybeans, cotton, and small grain. Bahiagrass and Coastal bermudagrass are the grasses used most often for hay or pasture. Some surface drainage is needed when this soil is used for crop production. Capability unit IIw-5; woodland group 2w8.

PeB—Persanti fine sandy loam, 2 to 6 percent slopes. This gently sloping soil is on relatively narrow ridges. It has a profile similar to that described as representative of the series, except that in most areas this soil has a decrease in clay content of more than 20 percent at about 50 to 60 inches from the surface.

Included with this soil in mapping are small areas of Varina, Summerton, and Dothan soils. Some included small areas of soils have slopes of less than 2 percent. There are a few eroded areas where the surface layer is thinner and the plow layer contains a mixture of material from the surface layer and the subsoil. The subsoil is exposed in a few small areas. A few areas include soils with a sandy loam or loamy fine sand surface layer.

Good tilth is easy to maintain on this soil except in small areas where the subsoil is exposed due to erosion.

About 60 percent of this soil is in crops or pasture. The remainder is in woodland. Principal crops are corn, soybeans, cotton, and small grain. Erosion is the main hazard on this soil. Contour tillage, cropping systems that include frequent sod crops, terraces, and grassed waterways are some practices that help control erosion on this soil. Capability unit IIe-3; woodland group 2w8.

Pocalla series

The soils of the Pocalla series are nearly level and well drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is dark grayish brown sand about 8 inches thick. The subsurface layer is pale brown loamy sand about 15 inches thick. The next layer is yellowish brown very friable sandy loam about 13 inches thick. Below this layer is 10 inches of yellowish brown loamy sand with pockets of pale brown sand. The next layer is friable sandy clay loam to a depth of 72 inches. The upper 14 inches is yellowish brown with yellowish red, strong brown, and pale brown mottles and about 7 percent nodules of plinthite; the lower 12 inches is mottled yellowish brown, strong brown, yellowish red, and gray with about 10 percent nodules of plinthite.

Pocalla soils occur with Dothan, Brogdon, Fuquay, Blanton, and Lakeland soils. Pocalla soils have a thicker A horizon than Dothan and Brogdon soils. Pocalla and Brogdon soils have an A2 horizon that is lacking in all of the other associated soils. Pocalla soils have a Bt horizon, whereas Lakeland soils do not.

Pocalla soils are low in organic matter. Permeability is moderate to moderately rapid. Surface runoff is slow. Available water capacity is low to medium.

Representative profile of Pocalla sand about 7.5 miles north of Marion on U.S. Highway 501. Site is 700 feet north of intersection of U.S. Highway 501 and S.C. Highway 38 and 300 feet west of U.S. 501 at edge of planted pines.

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) sand; weak medium granular structure; loose; common fine roots; medium acid (pH 5.7); abrupt smooth boundary.

A2—8 to 23 inches, pale brown (10YR 6/3) loamy sand; weak medium granular structure; loose; few fine roots; medium acid (pH 5.6); clear smooth boundary.

B2t—23 to 36 inches, yellowish brown (10YR 5/6) sandy loam; weak medium subangular blocky structure; very friable; sand grains coated and bridged with clay; strongly acid (pH 5.1); gradual wavy boundary.

B3&A'2—36 to 46 inches, yellowish brown (10YR 5/6) loamy sand; very weak medium subangular blocky structure; very friable; common

medium sized pockets of pale brown (10YR 6/3) uncoated sand grains; strongly acid (pH 5.4); gradual wavy boundary.

B'21t—46 to 60 inches, yellowish brown (10YR 5/6) sandy clay loam; common medium yellowish red (5YR 5/8), strong brown (7.5YR 5/6), and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; common (about 7 percent) coarse yellowish red and red firm brittle bodies; strongly acid (pH 5.3); gradual wavy boundary.

B'22t—60 to 72 inches, mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), yellowish red (5YR 5/8), and gray (10YR 6/1) sandy clay loam; weak medium subangular blocky structure; friable; common (about 10 percent) coarse yellowish red and red firm brittle bodies; very strongly acid (pH 5.0).

The solum is more than 72 inches thick. The A horizon is slightly acid through very strongly acid, and the B horizon is strongly acid or very strongly acid.

The A horizon is 21 to 35 inches thick. The Ap horizon is 7 to 10 inches thick. The A2 horizon is 13 to 27 inches thick and is pale brown, light yellowish brown, yellowish brown, or very pale brown sand or loamy sand.

The B1 horizon, where present, is 3 to 5 inches of yellowish brown loamy sand.

The B2t horizon is yellowish brown or strong brown and is 6 to 15 inches thick.

The B3&A'2 horizon or A'2 horizon is commonly 8 to 24 inches of yellowish brown, brownish yellow, light yellowish brown, or pale brown sand or loamy sand.

The B'2t horizon is commonly mottled with shades of brown, yellow, red, and gray. In some profiles it is dominantly yellowish brown, strong brown, light yellowish brown, or pale brown. The B'2t horizon is sandy clay loam or sandy loam, and it contains 5 to 15 percent firm, brittle bodies. This horizon extends to a depth of more than 72 inches.

PoA—Pocalla sand, 0 to 2 percent slopes. This soil occurs on broad upland ridges.

Included with this soil in mapping are small areas of Brogdon, Fuquay, Blanton, and Lakeland soils. There are a few small areas of moderately well drained soils. Some included small depressed areas of poorly drained soils are shown on the map by wet spot symbols. Also included are a few areas of soils with less than 5 percent firm, brittle bodies within 60 inches of the surface.

This soil is easily tilled over a wide range of moisture conditions.

About 85 percent of this soil is in crops and pasture. The rest is in woodland. The principal crops are cotton, corn, soybeans, tobacco, Coastal bermudagrass (fig. 4), bahiagrass, and sericea lespedeza. These soils are slightly droughty during periods of low rainfall. Wind erosion is a hazard on some of the larger fields. Stripcropping, windbreaks, and cropping systems that keep residue on the surface are used to control erosion and maintain organic matter. Capability unit IIs-5; woodland group 3s2.

Ponzer series

The soils of the Ponzer series are nearly level, very poorly drained, organic soils.

In a typical profile the surface layer is black sapric material about 41 inches thick. The upper 4 inches of the underlying material is very dark grayish brown fine sandy loam, and the next 27 inches is very dark brown clay loam.

Ponzer soils occur with Byars, Lynn Haven, Pantego, and Rutlege soils. Ponzer soils have an organic surface layer more than 16 inches thick, whereas all of the associated soils are mineral soils with a sandy or loamy surface layer high in organic matter.

Ponzer soils are very high in organic matter. Permeability is moderately slow. Surface runoff is very slow. Ponding occurs throughout the year. Available water capacity is high to very high.

Representative profile of Ponzer soils about 5 miles north of Marion, 1.8 miles west of U.S. Highway 501, in wooded area 200 feet south of S.C. Secondary Road 263.

Oa1—0 to 12 inches, black (5YR 2/1), unrubbed or rubbed, sapric material; less than 5 percent fiber, rubbed or unrubbed; moderate coarse subangular blocky structure; friable; many fine roots; extremely acid (pH 4.1); gradual irregular boundary.

Oa2—12 to 24 inches, black (N 2/0), unrubbed or rubbed, sapric material; 5 percent fiber; less than 5 percent fiber when rubbed; weak medium and coarse subangular blocky structure; friable; many fine and medium roots; extremely acid (pH 4.2); diffuse wavy boundary.

Oa3—24 to 41 inches, black (N 2/0), unrubbed or rubbed, sapric material; 5 percent fiber; less than 5 percent fiber when rubbed; weak medium and coarse subangular blocky structure; friable; common fine and medium roots; few small pockets of very dark grayish brown (10YR 3/2) clay loam; few partially decomposed wood fragments 1 to 2 inches in diameter, 3 to 6 inches long; very strongly acid (pH 4.7); clear smooth boundary.

IIC1—41 to 45 inches, very dark grayish brown (10YR 3/2) fine sandy loam; about 1 inch of grayish brown (10YR 5/2) sand at top of this horizon; weak medium subangular blocky structure; friable; common fine and medium old roots; very strongly acid (pH 4.6); clear smooth boundary.

IIC2—45 to 72 inches, very dark brown (10YR 2/2) clay loam; massive; very firm, plastic, sticky; very strongly acid (pH 4.8).

These soils are strongly acid through extremely acid throughout.

The organic layer is 16 to about 45 inches thick. Fiber content after rubbing is less than 5 percent. Color is black or very dark brown.

Texture of the underlying material includes sandy loam, loam, sandy clay loam, and clay loam. Color of this material is black, very dark gray, dark gray, very dark brown, or very dark grayish brown.

In some profiles a layer of sand or loamy sand 1 to 3 inches thick lies between the organic layer and the finer textured mineral layer.

PZ—Ponzer soils. These soils are nearly level and occur in low, depressed areas along some of the streams and also in some of the larger oval-shaped depressions, or 'Carolina bays.' This mapping unit was mapped at a lower intensity than most other units in this survey. The intensity is adequate to meet the needs for which the survey is made.

Included in mapping are soils with an organic surface layer thinner than 16 inches. Also included are small areas of Pantego, Byars, Rutlege, and Lynn Haven soils. These inclusions are mainly along the outer edge of the delineated areas. In some areas the organic material is underlain by clayey mineral material, and in a few areas, by sandy material.

Large areas of these soils are used for timber production and wildlife habitat. Intensive drainage is needed before crops can be grown. After draining, the soil is used primarily for corn and soybeans (fig. 5). Capability unit IVw-5; woodland group 4w3.

Rains series

The soils of the Rains series are nearly level and poorly drained. They formed in loamy Coastal Plain sediments.

In a typical profile the surface layer is black sandy loam about 4 inches thick. The subsurface layer is about 4 inches of gray sandy loam. The subsoil to a depth of 72 inches is dominantly gray with yellowish brown mottles. The upper 42 inches is friable sandy clay loam, and the lower 22 inches is firm sandy clay.

Rains soils occur with Fuquay, Dothan, Goldsboro, Centenary, Lynchburg, Coxville, and Pantego soils. Rains soils are more poorly drained than Fuquay, Dothan, Goldsboro, Centenary, and Lynchburg soils. Rains soils have a coarser textured subsoil than Coxville soils. Rains soils have a thinner dark surface layer than Pantego soils.

Rains soils are moderate in organic matter. Permeability is moderate, and surface runoff is slow. Available water capacity is medium.

Representative profile of Rains sandy loam about 5 miles east of Marion and 3/4 mile north of S.C. Secondary Road 19, in woods 300 feet west of S.C. Secondary Road 202.

A1—0 to 4 inches, black (10YR 2/1) sandy loam; weak fine granular structure; very friable; common fine and medium roots; very strongly acid (pH 4.5); clear smooth boundary.

A2—4 to 8 inches, gray (10YR 5/1) sandy loam; weak fine granular structure; very friable; common fine and medium roots; very strongly acid (pH 4.8); clear wavy boundary.

B21tg—8 to 18 inches, gray (10YR 5/1) sandy clay loam; weak medium subangular blocky structure; friable; few fine and medium roots; many fine pores; thin patchy clay films on faces of peds; very strongly acid (pH 4.6); gradual wavy boundary.

B22tg—18 to 35 inches, gray (10YR 5/1) sandy clay loam; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine and medium roots; many fine pores; thin patchy clay films on faces of peds; very strongly acid (pH 4.8); gradual wavy boundary.

B23tg—35 to 50 inches, gray (10YR 5/1) sandy clay loam; many medium distinct yellowish brown (10YR 5/8) and pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine pores; thin patchy clay films on faces of peds; very strongly acid (pH 4.9); gradual wavy boundary.

B24tg—50 to 72 inches, gray (10YR 6/1) sandy clay; common medium distinct yellowish brown (10YR 5/8) mottles and common medium faint light gray (10YR 7/1) and dark gray (10YR 4/1) mottles; weak medium subangular blocky structure; firm; thin patchy clay films on faces of peds; very strongly acid (pH 4.7).

The solum is more than 60 inches thick. The A horizon is medium acid through very strongly acid. The B horizon is strongly acid or very strongly acid.

The A horizon is 4 to 16 inches thick. The 4 to 9 inch Ap or A1 horizon is very dark gray, very dark grayish brown, dark gray, or black. The 2 to 10 inch A2 horizon, where present, is gray, dark gray, or light gray sandy loam or loamy sand.

The B1 horizon, where present, is 2 to 10 inches of sandy loam. It is gray, light brownish gray, or light gray and commonly has yellowish brown, brownish yellow, or yellow mottles.

The B2t horizon is from 40 to more than 60 inches thick. It is gray, light gray, dark gray, or light brownish gray with few to many mottles of brownish yellow, yellowish brown, brown, reddish yellow, yellowish red, strong brown, and pale brown. Texture of the B2t horizon is sandy clay loam or clay loam. In some profiles the B2t horizon is sandy clay below a depth of about 40 inches.

Ra—Rains sandy loam. This soil is nearly level and occurs along drainageways, in oval-shaped depressons, and on broad irregularly shaped flats.

Included with this soil in mapping are small areas of Lynchburg, Coxville, Osier, Pantego, and Rutlege soils. There are a few areas of soils that have a solum 50 to 60 inches thick. Some areas of soils are included that have a surface layer of loamy sand, loamy fine sand, or fine sandy loam.

About 75 percent of this soil is in woodland. The remainder is in crops and pasture. Principal crops are corn, soybeans, hay, and pasture grasses. Extensive drainage systems are needed if this soil is used for crops. Capability unit IIIw-4; woodland group 2w9.

Rimini series

The soils of the Rimini series are nearly level to gently sloping and excessively drained. These soils formed in beds of unconsolidated sands of the Coastal Plain.

In a typical profile the surface layer is about 7 inches of very dark gray sand with many uncoated white sand grains. The subsurface layer is about 33 inches of loose sand. The upper 10 inches is light gray and the lower 23 inches is white. The subsoil is about 21 inches of slightly brittle organic-coated sand. The upper 15 inches is black and dark reddish brown, and the lower 6 inches is black. The underlying material is loose sand to a depth of 80 inches. The upper 9 inches is light yellowish brown, and the lower part is pale brown.

Rimini soils occur with Lakeland, Centenary, Leon, Paxville, and Rutlege soils. Rimini soils have a spodic horizon, but Lakeland, Paxville, and Rutlege soils do not. Rimini soils are better drained than Paxville, Rutlege, Centenary, and Leon soils. Also in Rimini soils the horizons above the spodic horizon contain less fines than those of Centenary soils.

Rimini soils are low in organic matter. Permeability is very rapid in the surface and subsurface horizons and moderate in the spodic, or subsoil, horizon. Runoff is slow. Available water capacity is very low.

Representative profile of Rimini sand about 4 1/2 miles northeast of Mullins, 1 1/2 miles northwest of intersection of S.C. Secondary Roads 30 and 60, in wooded area 150 feet west of S.C. Secondary Road 30.

A1—0 to 7 inches, very dark gray (10YR 3/1) sand; many uncoated white sand grains; single grained; loose; many fine and medium roots; very strongly acid (pH 4.5); gradual wavy boundary.

A21—7 to 17 inches, light gray (10YR 7/1) sand; single grained; loose; few fine roots; strongly acid (pH 5.4); clear smooth boundary.

A22—17 to 40 inches, white (10YR 8/1) sand; single grained; loose; few fine roots; strongly acid (pH 5.4); abrupt wavy boundary.

B21h—40 to 55 inches, black (10YR 2/1) and dark reddish brown (5YR 3/2) sand; slightly brittle; most sand grains coated with organic matter; strongly acid (pH 5.1); clear wavy boundary.

B22h—55 to 61 inches, black (10YR 2/1) sand; slightly brittle and weakly cemented; most sand grains coated with organic matter; very strongly acid (pH 5.0); clear wavy boundary.

C1—61 to 70 inches, light yellowish brown (10YR 6/4) sand; single grained; loose; strongly acid (pH 5.4); gradual wavy boundary.

C2—70 to 80 inches, pale brown (10YR 6/3) coarse sand; single grained; loose; strongly acid (pH 5.5).

These soils are strongly acid to extremely acid throughout. Depth to the Bh horizon commonly ranges from 30 to about 50 inches.

The A1 horizon is 4 to 7 inches thick. It is black, very dark gray, dark gray, gray, or light gray and is a mixture of clean sand grains and organic-coated sand.

Thickness of the A2 horizon ranges from 25 to about 46 inches. It ranges from light gray to white.

The Bh horizon commonly ranges from 10 to more than 20 inches in thickness. Colors are black, very dark gray, very dark brown, very dark grayish brown, and dark reddish brown.

Some profiles have a B3 horizon that is brownish yellow, yellowish brown, or strong brown and often contains black or dark reddish brown spheroidal bodies.

These soils have a Bh horizon that is slightly closer to the surface than is defined as the range for the series, but this difference does not significantly alter their use and behavior.

RnB—Rimini sand, 0 to 6 percent slopes. This soil occurs on rims around some of the larger Carolina bays and along the Little Pee Dee and Lumber Rivers.

Included with this soil in mapping are some small areas of Lakeland, Centenary, and Leon soils. A few areas of included soils have a brittle horizon coated with organic material beginning 50 to 70 inches below the surface. Also included are a few areas of soils that do not have a continuous, brittle horizon coated with organic material.

All of this soil is in woodland. Native vegetation is blackjack and turkey oak with a few longleaf pines. This soil is not suited to cultivation. Capability unit VIs-1; woodland group 5s3.

Rutlege series

The soils of the Rutlege series are nearly level, very poorly drained soils that formed in sandy Coastal Plain sediments.

In a typical profile the surface layer is black loamy sand about 12 inches thick. The underlying material is sand. The upper 10 inches is light gray and the next 38 inches is gray.

Rutlege soils occur with Osier, Lynn Haven, Paxville, Pantego, Rains, Centenary, Lakeland, and Foreston soils. Rutlege soils are more poorly drained than Centenary, Lakeland, and Foreston soils. Rutlege soils are coarser textured than Paxville, Pantego, and Rains soils. Rutlege soils have a thicker dark surface layer than Osier soils. Rutlege soils lack the spodic horizon that occurs in the Lynn Haven soils.

Rutlege soils are high in organic matter. Permeability is rapid, but is impeded by the high water table most of the year. Surface runoff is very slow. Ponding is frequent. Available water capacity is low.

Representative profile of Rutlege loamy sand about 2 1/2 miles west of Nichols, 1/4 mile south of intersection of S.C. Secondary Roads 30 and 60, in wooded area 500 feet east of S.C. Secondary Road 60.

A1—0 to 12 inches, black (10YR 2/1) loamy sand; very weak medium granular structure; loose; many medium and fine roots; very strongly acid (pH 4.8); clear smooth boundary.

C1g—12 to 22 inches, light gray (10YR 6/1) sand; single grained; loose; few fine and medium roots; very strongly acid (pH 5.0); gradual wavy boundary.

C2g—22 to 60 inches, gray (10YR 5/1) sand; single grained; loose; strongly acid (pH 5.1).

The soil is strongly through extremely acid throughout.

The A horizon is 11 to 20 inches thick. It is black or very dark gray.

The C horizon is dark gray, gray, light gray, dark grayish brown, light brownish gray, or grayish brown and may be mottled with these colors or shades of yellow and brown.

Ru—Rutlege loamy sand. This soil is nearly level and occurs in shallow depressions or oval-shaped bays, on upland flats, and along borders of small streams and drainageways.

Included with this soil in mapping are small areas of Osier, Pantego, Paxville, Lynn Haven, and Leon soils. Some areas are included that have sandy loam material in the C horizon. Also included are some areas of soils with a surface layer of sand, loamy fine sand, or mucky loam.

Most of this soil is in woodland of gums, water-tolerant oaks, cypress, and a few pines. A few areas are in pasture. Cultivated crops are unsuited. Many areas are subject to frequent flooding. Capability unit Vw-2; woodland group 2w9.

Smithboro series

The soils of the Smithboro series are nearly level and somewhat poorly drained. They formed in clayey Coastal Plain sediments.

In a typical profile the surface layer is about 6 inches of dark grayish brown silt loam. The subsoil extends to a depth of 75 inches. In the upper 11 inches it is mottled brownish yellow and light brownish gray very firm clay loam with yellowish red mottles; the next 27 inches is gray firm clay loam mottled with yellowish brown and red; and the lower 31 inches is mottled gray and yellowish brown firm clay.

Smithboro soils occur with Summerton, Persanti, Duplin, Dunbar, Coxville, Cantey, and Byars soils. Smithboro soils are more poorly drained than Summerton, Persanti, and Duplin soils, and they are better drained than Coxville, Cantey, and Byars soils. Smithboro soils are higher in silt content and have a subsoil that is more firm, plastic, and sticky than Dunbar soils.

Smithboro soils are moderate in organic matter. Permeability is slow, and surface runoff is slow. Available water capacity is medium.

Representative profile of Smithboro silt loam about 2 miles west of Marion in idle field about 400 feet north of U.S. Highway 76.

Ap—0 to 6 inches, dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid (pH 5.1); abrupt smooth boundary.

B21t—6 to 17 inches, mottled brownish yellow (10YR 6/6) and light brownish gray (10YR 6/2) clay loam; few medium distinct yellowish red (5YR 4/8) mottles; strong medium subangular blocky structure; very firm; common fine roots; few fine pores; thick continuous clay films on faces of peds that are light brownish gray (10YR 6/2); very strongly acid (pH 4.6); gradual wavy boundary.

B22tg—17 to 31 inches, gray (10YR 6/1) clay loam; many medium and coarse distinct yellowish brown (10YR 5/6) mottles, common medium prominent red (2.5YR 4/8) mottles and few medium faint pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; few fine roots; few fine pores; thick continuous clay films on faces of peds; very strongly acid (pH 4.7); gradual wavy boundary.

B23tg—31 to 44 inches, gray (10YR 6/1) clay loam; many medium and coarse distinct yellowish brown (10YR 5/8) mottles and few medium faint pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; firm; few fine roots; thin continuous clay films on faces of peds; very strongly acid (pH 4.7); gradual wavy boundary.

B24tg—44 to 62 inches, mottled gray (10YR 6/1) and yellowish brown (10YR 5/8) clay; common medium distinct strong brown (7.5YR 5/6) mottles and a few medium prominent yellowish red (5YR 4/6) mottles; moderate medium subangular blocky structure; firm; few fine flakes of mica; few small concretions; thin patchy clay films on faces of peds; extremely acid (pH 4.4); gradual wavy boundary.

B3g—62 to 75 inches, coarsely mottled gray (10YR 6/1) and yellowish brown (10YR 5/8) clay; common medium faint light brownish gray (10YR 6/2) mottles; weak coarse subangular blocky structure; firm; thin patchy clay films on faces of peds; extremely acid (pH 4.3).

The solum is more than 60 inches thick. The A horizon is strongly acid or very strongly acid, and the B horizon is strongly acid through extremely acid.

Total thickness of the A horizon is 5 to 9 inches. The A1 or Ap horizon is 4 to 7 inches of very dark gray, dark grayish brown, dark gray, or grayish brown. The A2 horizon, where present, is 2 or 3 inches of light brownish gray or brown fine sandy loam.

The B1 horizon, where present, is 2 to 7 inches of loam, clay loam, sandy clay loam, or silty clay loam. It is light yellowish brown, light olive brown, pale brown, very pale brown, or brownish yellow with mottles of grayish brown, light grayish brown, yellowish brown, or strong brown.

The B2t horizon is more than 35 inches thick. Texture of the B2t horizon is clay, clay loam, silty clay, or silty clay loam. Clay content is 35 to 60 percent, and silt content is 30 to 45 percent. The B2t horizon is mottled with gray, light gray, yellowish brown, light yellowish brown, strong brown, yellowish red, or red. Mottles with chroma of 3 or more are dominant in the upper few inches, and gray is the dominant color in the lower portion of the B2t horizon.

The B3 horizon is gray or light gray with mottles of yellowish brown, strong brown, yellowish red, or red. Texture of the B3 horizon includes clay, sandy clay, clay loam, and silty clay loam.

Sm—Smithboro silt loam. This soil is nearly level and occurs in broad, nearly level, low areas on uplands and on the terraces of the larger streams of the survey area.

Included with this soil in mapping are small areas of Persanti, Eunola, Duplin, Dunbar, Coxville, and Cantey soils. Also included are areas with a loam, fine sandy loam, or sandy loam surface layer. A few areas include soils in which clay content decreases more than 20 percent within 60 inches of the surface.

About 60 percent of this soil is in woodland. The rest is in row crops or pasture. Tilth is fair on most areas of this soil. The principal cultivated crops are corn, soybeans, small grain, and some cotton and tobacco. Extensive surface drainage is needed for the production of crops. Capability unit IIIw-3; woodland group 2w8.

Summerton series

The soils of the Summerton series are nearly level to sloping and well drained. They formed in clayey Coastal Plain sediments.

In a typical profile the surface layer is about 7 inches of brown fine sandy loam. The subsoil is very firm clay to a depth of 80 inches. In sequence from the top, it is 13 inches of red with strong brown mottles; 14 inches of strong brown with red mottles; 34 inches of mottled red and strong brown; and 12 inches of strong brown with gray and yellowish red mottles.

Summerton soils occur with Varina, Dothan, Persanti, Duplin, Dunbar, Smithboro, Cantey, and Coxville soils. Summerton soils do not have the plinthite which occurs in Varina and Dothan soils. In addition, they have a finer textured subsoil than Dothan soils. Summerton soils are better drained than Persanti, Duplin, Dunbar, Smithboro, Cantey, and Coxville soils.

Summerton soils are low in organic matter. Permeability is moderately slow. Surface runoff is medium. Available water capacity is medium.

Representative profile of Summerton fine sandy loam about 5 miles southwest of Marion, 2,000 feet south of intersection of S.C. Secondary Roads 54 and 248, in cultivated field 100 feet south of field road.

Ap—0 to 7 inches, brown (7.5YR 5/4) fine sandy loam; weak fine granular structure; very friable; common fine roots; medium acid (pH 5.7); abrupt smooth boundary.

B21t—7 to 20 inches, red (2.5YR 5/6) clay; common medium distinct strong brown (7.5YR 5/6) and red (10R 4/6) mottles; moderate medium subangular blocky structure; very firm; thick continuous clay films on faces of peds; very strongly acid (pH 4.6); clear smooth boundary.

B22t—20 to 34 inches, strong brown (7.5YR 5/6) clay; many medium prominent red (10R 4/8) mottles; moderate medium subangular blocky structure; very firm; thick continuous clay films on faces of peds; few fine flakes of mica; very strongly acid (pH 4/6); gradual smooth boundary.

B23t—34 to 68 inches, mottled red (2.5YR 4/8) and strong brown (7.5YR 5/6) clay; moderate medium subangular blocky structure; very firm; thick continuous clay films on faces of peds; few fine flakes of mica; very strongly acid (pH 4.6); gradual smooth boundary.

B3—68 to 80 inches, strong brown (7.5YR 5/6) clay; common medium distinct light gray (10YR 7/1) mottles and few fine distinct yellowish red mottles; weak medium subangular blocky structure; very firm; thin patchy clay films on faces of peds; few fine flakes of mica; very strongly acid (pH 4.6).

The solum is more than 60 inches thick. The A horizon is slightly acid through very strongly acid. The B and C horizons are strongly acid or very strongly acid.

Total thickness of the A horizon ranges from 4 to 10 inches. The 4- to 9-inch thick Ap or A1 horizon is commonly brown or yellowish brown, but ranges to grayish brown, dark grayish brown, or strong brown. The A2 horizon, where present, is 2 to 4 inches of pale brown, very pale brown, yellowish brown, or light yellowish brown fine sandy loam or loamy fine sand.

The B1 horizon, where present, is 3 to 6 inches of strong brown or yellowish brown sandy clay loam or clay loam.

The B2t horizon is 21 to more than 60 inches of firm or very firm clay, silty clay, sandy clay, clay loam, or silty clay loam. The B2t horizon is red, yellowish red, yellowish brown, or strong brown with mottles of these colors and also of very pale brown, pale brown, and light gray.

The B3 horizon is commonly mottled in shades of brown, red, yellow, and gray. Texture is sandy clay loam, clay loam, sandy clay, or clay.

The C horizon occurs at depths greater than 60 inches, and is mottled in shades of red, brown, yellow, and gray. Texture is sandy loam, sandy clay loam, or stratified clay and loamy sand.

SuA—Summerton fine sandy loam, 0 to 2 percent slopes. This nearly level soil has the profile described as representative of the series. It is on broad areas of stream terraces and also on upland areas.

Included with this soil in mapping are small areas of Varina, Dothan, Persanti, and Duplin soils. Also included are small, wet, depressional areas of Coxville, Cantey, and Paxville soils that are shown on the map by wet spot

symbols. Some areas include soils in which clay content decreases more than 20 percent within 60 inches of the surface. Included, too, are areas of soils with a loamy fine sand, sandy loam, and very fine sandy loam surface layer.

This soil has fairly good tilth.

About 70 percent of this soil is in cultivation. The rest is woodland. Principal cultivated crops are tobacco, corn, soybeans, cotton, and small grain. The principal grasses are Coastal bermudagrass and bahiagrass. Row crops can be grown each year if crop residues are returned to the soil to help maintain organic matter and good tilth. Capability unit I-2; woodland group 3o1.

SuB—Summerton fine sandy loam, 2 to 6 percent slopes. This gently sloping soil is on relatively narrow ridges.

Included with this soil in mapping are small areas of Varina, Dothan, and Persanti soils. There are some areas of soils with slopes of less than 2 percent, or greater than 6 percent. Some areas include soils that have a 20 percent decrease in clay content within 60 inches of the surface. Some areas that have a surface layer of loamy fine sand or sandy loam are also included. Some mapped areas include soils in which most of the original topsoil has eroded and the remaining topsoil and upper subsoil have been mixed in plowing. The surface layer in these areas is loam or clay loam. There are some small areas where all the original topsoil has been eroded and the plow layer is the upper subsoil.

This soil has fairly good tilth, except in eroded areas where the tilth is poor. Uniform stands of crops are difficult to obtain on these eroded spots.

About 60 percent of this soil is in crops or pasture. The rest is in woodland. The principal crops are corn, soybeans, cotton, and small grain.

Erosion is the chief hazard on this soil. Contour tillage and crop rotations that include frequent sod crops are sufficient to control erosion on some fields. On other fields, terraces, grassed waterways, and contour tillage are also needed. Crop residue kept on or near the surface increases infiltration and helps to reduce erosion. Capability unit IIe-2; woodland group 3o1.

SuC—Summerton fine sandy loam, 6 to 10 percent slopes. This sloping soil occurs mostly in long narrow areas parallel to streams and drainageways.

Included with this soil in mapping are some small areas of Varina, Dothan, Fuquay, and Persanti soils. Also included are some areas of soils with slopes of less than 6 percent and some eroded areas. Some areas include soils that have a 20 percent decrease in clay content within 60 inches of the surface. There are some areas of soils with a surface layer of loamy fine sand or sandy loam.

This soil has fairly good tilth in most areas.

About 80 percent of this soil is in woodland. The rest is in crops or pasture or is idle. The principal crops are cotton, corn, and soybeans.

Erosion is the chief hazard on this soil. Contour tillage and crop rotations that include frequent sod crops are sufficient to control erosion on some fields. On other fields, terraces, grassed waterways, and contour tillage are also needed. Crop residue kept on or near the surface increases infiltration and helps to reduce erosion. Capability unit IIIe-3; woodland group 3o1.

Tawcaw series

The soils of the Tawcaw series are nearly level, somewhat poorly drained soils that formed in clayey alluvial sediments on flood plains. They are subject to frequent flooding.

In a typical profile the surface layer is dark yellowish brown silty clay about 7 inches thick. The subsoil is about 43 inches thick. The upper 20 inches of this layer is yellowish brown firm clay loam with light brownish gray mottles; the next 23 inches is mottled gray firm clay. Beneath this is 6 inches of gray friable sandy loam. The underlying material is dominantly light gray loamy sand.

Tawcaw soils occur with Chastain, Byars, and Cantey soils. Tawcaw soils are better drained than any of these soils and they do not have an argillic horizon as do Byars and Cantey soils.

Tawcaw soils are moderate in organic matter. Permeability and surface runoff are slow. Available water capacity is medium to high.

These soils were mapped in an association with Chastain soils.

Representative profile of Tawcaw silty clay about 10 miles southwest of Marion, 300 feet southwest of sharp bend in woods road.

A1—0 to 7 inches, dark yellowish brown (10YR 4/4) silty clay; weak medium subangular blocky structure; friable; common fine and medium roots; few fine flakes of mica; strongly acid (pH 5.1); clear smooth boundary.

B21—7 to 27 inches, yellowish brown (10YR 5/6) clay loam; many medium distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; common fine pores; few fine flakes of mica; very strongly acid (pH 5.0); gradual wavy boundary.

B22g—27 to 50 inches, mottled gray (10YR 6/1), strong brown (7.5YR 5/6), yellowish brown (10YR 5/6), and yellowish red (5YR 5/6) clay; moderate medium subangular blocky structure; firm; few fine roots; few flakes of mica; very strongly acid (pH 5.0); gradual wavy boundary.

IIC1g—50 to 56 inches, gray (5Y 6/1) and light gray (10YR 7/1) sandy loam; common medium faint pale brown (10YR 6/3) mottles; massive; friable; few flakes of mica; strongly acid (pH 5/3); gradual wavy boundary.

IIC2g—56 to 72 inches, light gray (10YR 7/1) loamy sand; common medium distinct brownish yellow (10YR 6/6) mottles; single grained; loose; common flakes of mica; strongly acid (pH 5.5).

The solum ranges from 40 to 65 inches thick. These soils range from slightly acid through very strongly acid throughout.

The A horizon is 6 to 10 inches thick. It is yellowish brown, dark yellowish brown, brown, dark brown, or grayish brown. Texture of the A horizon is loam, silt loam, clay loam, silty clay loam, or silty clay.

The B2 horizon is from 20 to more than 50 inches thick. Texture of the B2 horizon is clay loam, silty clay loam, silty clay, or clay. The B21 horizon is dominantly yellowish brown, light yellowish brown, or brown. Mottles of chroma 2 or less are within 24 inches of the surface. The B22 horizon is gray, light gray, or light brownish gray with brown mottles, or it is mottled gray and brown.

The B3 horizon, where present, is 5 to 15 inches thick. It is dominantly gray, light gray, or greenish gray with brown mottles. Texture is sandy clay loam or clay loam.

The C horizon is dominantly gray, light gray, light brownish gray, or pale brown sand, loamy sand, or sandy loam.

TC—Tawcaw-Chastain association, frequently flooded. These are nearly level Tawcaw, Chastain, and other similar soils that occur in heavily wooded areas on flood plains of the Great Pee Dee River. These soils occur in a somewhat regular pattern, and they could be mapped separately at the scale used; however, this unit was mapped at a lower intensity than most units in this survey. The intensity is adequate to meet the needs for which the survey is made.

The Tawcaw soils are somewhat poorly drained and make up about 54 percent of the association. They occur on low ridges adjoining the Chastain soils. The Chastain soils are poorly drained and make up about 40 percent of the association. They occur in the lowest areas, usually in sloughs and long, narrow depessions. Other soils, such as Rutlege and Cahaba soils, make up the remaining 6 percent. A profile of the Tawcaw soil and the Chastain soil are described as representative of their respective series.

All of this association is in woodland, consisting mostly of cypress, water-tolerant hardwoods, and some pine in the higher areas. The entire association is subject to frequent flooding of long duration, mainly during the months of December through April. Water stands in some of the lower areas a large part of the year. If protected from flooding, the higher areas of Tawcaw soils are suited to corn, soybeans, small grain, and pasture grasses. These soils are well suited to hardwood timber production. Capability unit VIIw-3; Tawcaw soils in woodland group 1w8, Chastain soils in woodland group 2w9.

Varina series

The soils of the Varina series are nearly level to gently sloping and well drained. They formed in clayey Coastal Plain sediments.

In a typical profile the surface layer is dark grayish brown fine sandy loam about 8 inches thick. The subsurface layer is pale brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of 80 inches. In sequence from the top, it is 13 inches of yellowish brown friable clay loam; 17 inches of yellowish brown firm clay with red mottles and 5 to 10 percent nodules of plinthite; 22 inches of mottled red, yellowish brown, and light gray firm clay with 15 to 20 percent nodules of plinthite; and 16 inches of mottled red, dark red, strong brown, and light gray firm sandy clay loam with 5 to 10 percent nodules of plinthite.

Varina soils occur with Dothan, Summerton, Persanti, Duplin, and Dunbar soils. Varina soils have more clay in the subsoil than Dothan soils. Varina soils have a horizon within 60 inches of the surface that contains more than 5 percent nodules of plinthite whereas Summerton, Persanti, Duplin, and Dunbar soils do not have nodules of plinthite. In addition, Varina soils are better drained than Persanti, Duplin, and Dunbar soils.

Varina soils are low in organic matter. Permeability is moderate in the upper part of the subsoil and slow in the lower part containing nodules of plinthite. Surface runoff is medium. Available water capacity is medium.

Representative profile of Varina fine sandy loam about 1.7 miles southeast of Sellers, in a cultivated field 200 feet west of S.C. Secondary Road 263.

Ap—0 to 8 inches, dark grayish brown (10YR 4/2) fine sandy loam; weak fine granular structure; very friable; common fine and medium roots; strongly acid (pH 5.5); abrupt smooth boundary.

A2—8 to 12 inches, pale brown (10YR 6/3) fine sandy loam; few medium prominent yellowish red (5YR 4/8) mottles; few fingers of Ap material extend into this horizon; weak fine granular structure; very friable; common fine and medium roots; common fine pores; slightly acid (pH 6.3); abrupt wavy boundary.

B21t—12 to 25 inches, yellowish brown (10YR 5/6) clay loam; few medium prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine roots; common fine pores; thin patchy clay films on faces of peds; strongly acid (pH 5.3); gradual wavy boundary.

B22t—25 to 42 inches, yellowish brown (10YR 5/6) clay; common medium prominent red (2.5YR 4/6) mottles; weak medium subangular blocky structure; firm; few fine roots; few fine pores; common (5 to 10 percent) medium red brittle bodies; thin patchy clay films on faces of peds; very strongly acid (pH 5.0); gradual wavy boundary.

B23t—42 to 64 inches, reticulately mottled red (2.5YR 4/8), yellowish brown (10YR 5/8), and light gray (10YR 7/1) clay; weak medium subangular blocky structure; firm; common (15 to 20 percent) medium and coarse red brittle bodies; thin patchy clay films on faces of peds; very strongly acid (pH 4.9); gradual wavy boundary.

B3—64 to 80 inches, mottled red (2.5YR 4/8), dark red (10R 3/6), strong brown (7.5YR 5/8), and light gray (10YR 7/1) sandy clay loam; weak medium subangular blocky structure; firm; common (5 to 10 percent) medium and coarse red brittle bodies; very strongly acid (pH 4.8).

The solum is more than 70 inches thick. The A horizon ranges from slightly acid through strongly acid. The B horizon is strongly acid or very strongly acid. A few small, hard sesquioxide nodules occur throughout the profile in some areas.

The A horizon is 7 to 12 inches thick. The 7 to 9 inch Ap horizon is dark grayish brown, grayish brown, or brown. The A2 horizon, where present, is 3 to 4 inches of pale brown or brown loamy fine sand, sandy loam, or fine sandy loam.

The B2t horizon is 45 to more than 60 inches thick. The upper part of the B2t horizon is dominantly yellowish brown or strong brown with few to common yellowish red or red mottles; the lower part is commonly mottled with varying shades of red, brown, yellow, and gray. Plinthite nodules, 5 to 25 percent by volume, occur in these horizons, commonly increasing in amount from the middle of the B2t horizon downward. The texture of the B2t horizon is clay loam, sandy clay, and clay.

The B3 horizon is mottled with varying shades of red, yellow, brown, and gray. Texture of the B3 horizon is sandy clay loam, clay loam, or sandy clay.

VaA—Varina fine sandy loam, 0 to 2 percent slopes. This nearly level soil has the profile described as representative of the series. It occurs on broad ridges of the uplands.

Included with this soil in mapping are small areas of Dothan, Duplin, and Summerton soils. In some long narrow areas adjacent to drainageways, soils with slopes of 2 to 6 percent are included. Also included are some areas of soils with less than 5 percent nodules of plinthite within 60 inches of the surface. Small wet depressed areas less than 4 acres in size are included and shown on the map

by wet spot symbols. Also included are areas of soils with a loamy fine sand or sandy loam surface layer.

Most of the acreage of this soil is in cultivation. The principal crops are tobacco, cotton, corn, soybeans, small grains, bahiagrass, and Coastal bermudagrass. Good tilth is easy to maintain on this soil. Trees and deep rooted crops may be damaged because water movement and root growth are restricted by the plinthite layer. Capability unit IIs-4; woodland group 3o1.

VaB—Varina fine sandy loam, 2 to 6 percent slopes. This gently sloping soil occurs on broad ridges and narrow slopes parallel to streams and drainageways.

Included with this soil in mapping are small areas of Dothan, Persanti, and Summerton soils. A few small areas of soils have less than 5 percent nodules of plinthite within 60 inches of the surface. Also included are a few eroded areas where the surface layer is thinner and the plow layer contains a mixture of material from the surface layer and the subsoil. A few small, wet, depressed areas, less than 4 acres in size, are included in some places and shown on the map by wet spot symbols. Some included long narrow areas, less than 200 feet wide, of wet soils are along drains or small streams. Included are some areas of soils with a loamy fine sand, sandy loam, or loam surface layer.

About 70 percent of this soil is cultivated. The rest is in pasture or woodland. The principal crops on this soil are tobacco, corn, soybeans, cotton, and small grain. Bahiagrass and Coastal bermudagrass are the better suited plants for hay and pasture. Trees and deep rooted crops may be damaged because water movement and root pentration are restricted by the plinthite layer. Tilth is easy to maintain except in small areas where the subsoil has been exposed by erosion.

Erosion is the chief hazard on this soil. Contour tillage and crop rotations that include frequent sod crops are sufficient to control erosion on some fields. On other fields, terraces, grassed waterways, and contour tillage are also needed. Crop residue kept on or near the surface increases infiltration and helps to reduce erosion. Capability unit IIe-5; woodland group 3o1.

Use and management of the soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops, pasture, and woodland and as sites for buildings, highways and other transportation systems, sanitary facilities, parks and other recreation facilities, and wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates wetness or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and pasture

C.A. HOLDEN, conservation agronomist, Soil Conservation Service, assisted in preparing this section.

The major management concerns in the use of the soils for crops and pasture are described in this section. In addition, the crops or pasture plants best suited to the soil, including some not commonly grown in the survey area, are discussed; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are presented for each soil.

This section provides information about the overall agricultural potential of the survey area and about the needed management practices. The information is useful to equipment dealers, land improvement contractors, fertilizer companies, processing companies, planners, conservationists, and others. For each kind of soil, information about management is presented in the section "Descriptions of the soils." Planners of management systems for individual fields or farms should also consider the detailed information given in the description of each soil.

Most soils in the county require similar basic, or general, management practices to produce satisfactory yields. These include applying lime and the proper fertilizer, maintaining the organic-matter content of the soil, selecting a good cropping system, tilling the soil properly, controlling erosion, and improving drainage. These basic management practices are discussed in this section.

Most of the soils in Marion County are acid and low in natural fertility. Nearly all require regular applications of lime and fertilizers for good crop yields. The kind of fertilizer and the amount of lime and fertilizer to apply is most efficiently determined by a soil test.

Some of the soils of this county leach rapidly, and lime and fertilizers are lost before crops can benefit from them. Lime and fertilizers are more effective on such soils when they are applied more frequently but in smaller amounts. Fertilization should be the maximum that is consistent with economic returns.

The grasses and legumes in Marion County's pastures require regular applications of lime, nitrogen, phosphorus, and potash for sustained high production, yet these same grasses and legumes provide erosion control with a minimum of lime and fertilizer.

Most of the soils in this county are low or moderate in content of organic matter. It is not practical, in most cases, to raise the organic-matter content to what it was when early settlers cleared the land. It is important to maintain the present level and perhaps increase it a little over a long period of time.

Crop residue, cover crops, and rotations that include sod crops are the primary sources of organic matter in Marion County. Rye is one of the better cover crops in the county, and all the grasses and legumes adapted to the county can be used in rotations as sod crops.

A cropping system should be selected that supplies organic matter. If cover crops and crop residues, especially those from legumes, are plowed under, yields of the succeeding crops are increased. Good cropping systems help to control erosion, insects, plant diseases, and weeds. The organic matter gained through a good cropping system absorbs plant nutrients and releases them to crops over a long period. Without the additional organic matter, fertilizer (especially nitrogen) leaches out rapidly if it is not used up by a growing crop.

The soils of the county are particularly well suited to warm- season plants. Corn, cotton, tobacco, and soybeans are the principal row crops. Wheat is the leading small grain; oats and barley are secondary. Coastal bermudagrass is used extensively for pasture and hay. Sericea lespedeza, tall fescue, and bahiagrass are used to a lesser extent.

Most of the arable soils in Marion County can be tilled within a wide range of moisture conditions. Exceptions are such soils as the Coxville, Pantego, and Smithboro soils, which have a relatively fine textured topsoil and which puddle and pack and become cloddy if tilled when wet. Other soils, especially those of the Brogdon, Dothan, and Fuquay series, develop a compacted restrictive layer called a tillage pan or plowsole if tilled repeatedly at the same depth. Growing sod crops and varying the depth of tillage prevents the formation of a plowpan.

Tillage systems which leave a mulch of crop residue on the surface of the soil have been successful in Marion County (fig. 6). These systems disturb the soil the least, return organic matter to the soil, and help to prevent soil losses caused by wind and water erosion.

Soil erosion may be caused by wind or water in Marion County. Large fields of such soils as those of the Brogdon, Dothan, and Fuquay series are especially susceptible to wind erosion when they have been freshly plowed and the surface layer is dry. This usually occurs in spring. Windbreaks, cover crops, wind stripcropping, and tillage systems which leave crop residue on the surface are used to control wind erosion.

Most soils in Marion County that are used for crops and have slopes of more than 2 percent are subject to damage by water erosion. Water erosion can be controlled by diversions, terraces, contour tillage, and grassed waterways. Cropping systems that include sod crops in the rotation and tillage that leaves protective residue on the surface also help control water erosion.

Drainage is essential for good crop production on many Marion County soils, especially Dunbar, Coxville, and Smithboro soils. Drainage ditches and tile drainage systems are used in this county, and they are often used in combination. Land smoothing and bedding systems are also sometimes used.

Capability classes and subclasses

Capability classes and subclasses show, in a general way, the suitability of soils for most kinds of field crops. The soils are classed according to their limitations when they are used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops that require special management. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for forest trees or for engineering purposes.

In the capability system, all kinds of soil are grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs. A survey area may not have soils of all classes.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The

letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability unit is identified in the description of each soil mapping unit in the section "Descriptions of the soils." Capability units are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-2 or IIIw-3.

In the following paragraphs the classes, subclasses, and capability units in Marion County are described.

Class I. Soils have few limitations that restrict their use. (Class I has no subclasses.)

Unit I-1. Nearly level, well drained soils with loamy subsoils through which water moves at a moderate rate.

Unit I-2. Nearly level, well drained soils with clayey subsoils.

Unit I-5. Nearly level, well drained soils with loamy subsoils through which water moves at a moderately slow rate.

Class II. Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Subclass IIe. Soils subject to moderate erosion unless protected.

Unit IIe-2. Gently sloping, well drained soils with clayey subsoils.

Unit IIe-3. Gently sloping, moderately well drained soils with clayey subsoils.

Unit IIe-5. Gently sloping, well drained soils with loamy or clayey subsoils underlain by layers containing plinthite which restrict roots and the movement of water.

Subclass IIw. Soils moderately limited because of excess water.

Unit IIw-2. Nearly level, moderately well drained or somewhat poorly drained soils with loamy subsoils.

Unit IIw-5. Nearly level, moderately well drained or somewhat poorly drained soils with clayey subsoils.

Subclass IIs. Soils moderately limited because of low water-holding capacity, restrictive layers, or both. Large cultivated fields of these soils are subject to wind erosion.

Unit IIs-1. Nearly level to gently sloping, slightly droughty soils. These soils have sandy surface layers 20 to 40 inches thick and friable loamy subsoils through which water moves freely.

Unit IIs-3. Nearly level, slightly droughty soils with loamy subsoils.

Unit IIs-4. Nearly level, well drained soils with clay subsoils with layers containing plinthite which restricts root development and the movement of water.

Unit IIs-5. Nearly level to gently sloping, well drained soils with sandy surface layers 20 to 40 inches thick and loamy subsoils with layers containing plinthite which restricts root development and the movement of water.

Class III. Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Subclass IIIe. Soils subject to severe erosion if they are cultivated and not protected.

Unit IIIe-3. Sloping, well drained soils with clayey subsoils.

Subclass IIIw. Soils severely limited for cultivation because of excess water.

Unit IIIw-2. Nearly level, poorly or very poorly drained soils with clayey subsoils.

Unit IIIw-3. Nearly level, somewhat poorly drained soils with loamy surface layers and clayey subsoils.

Unit IIIw-4. Nearly level, poorly or very poorly drained soils with loamy subsoils.

Subclass IIIs. Soils severely limited because of low available water capacity.

Unit IIIs-1. Nearly level to gently sloping, droughty soils with sandy surface layers 40 to 72 inches thick and loamy subsoils.

Unit IIIs-2. Sloping, well drained, slightly droughty soils with sandy surface layers 20 to 40 inches thick and loamy subsoils with layers containing plinthite which restricts root development and the movement of water.

Unit IIIs-3. Nearly level, moderately well drained soils with sandy surface layers and subsoils and low available water capacity.

Class IV. Soils have very severe limitations that reduce the choice of plants, require very careful management, or both.

Subclass IVw. Soils very severely limited because of excess water.

Unit IVw-2. Nearly level, poorly drained soils with loamy surface layers and clayey subsoils through which water moves slowly.

Unit IVw-4. Nearly level, poorly drained sandy soils with organic hardpan subsurface layers.

Unit IVw-5. Nearly level, very poorly drained soils with organic surface layers and loamy subsoils.

Subclass IVs. Soils very severely limited because of low available water capacity.

Unit IVs-1. Nearly level to gently sloping, droughty, sandy soils.

Class V. Soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture, woodland, or wildlife habitat.

Subclass Vw. Soils too wet for cultivation and often difficult to drain.

Unit Vw-2. Nearly level, poorly or very poorly drained sandy soils with rapid permeability.

Unit Vw-5. Nearly level poorly drained sandy soils with organic hardpan subsurface layers that restrict permeability.

Class VI. Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, woodland, or wildlife habitat.

Subclass VIs. Soils generally unsuitable for cultivation and limited for other uses by their low available water capacity.

Unit VIs-1. Nearly level to gently sloping sandy soils that are excessively drained, droughty, and unproductive.

Class VII. Soils have severe limitations that make them unsuited to cultivation and restrict their use largely to woodland or wildlife food and cover.

Subclass VIIw. Soils very severely limited by frequent flooding.

Unit VIIw-3. Nearly level, somewhat poorly to very poorly drained clayey soils subject to frequent flooding.

Unit VIIw-4. Nearly level, very poorly drained loamy and sandy soils subject to frequent flooding.

Subclass VIIs. Soils very severely limited by low water-holding capacity.

Unit VIIs-2. Pits from which the soil has been excavated and removed.

Class VIII. Soils and landforms have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife habitat, water supply, or esthetic purposes. (There are no Class VIII soils in Marion County.)

Yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 2. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. Absence of an estimated yield indicates that the crop is not suited to or not commonly grown on the soil.

The estimated yields were based mainly on the experience and records of farmers, conservationists, and extension agents. Results of field trials and demonstrations and available yield data from nearby counties were also considered.

The yields were estimated assuming that the latest soil and crop management practices were used. Hay and pasture yields were estimated for the most productive varieties of grasses and legumes suited to the climate and the soil. A few farmers may be obtaining average yields higher than those shown in table 2.

The management needed to achieve the indicated yields of the various crops depends on the kind of soil and the crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residues, barnyard manure, and green-manure crops; harvesting crops with the smallest possible loss; and timeliness of all fieldwork.

The estimated yields reflect the productive capacity of the soils for each of the principal crops. Yields are likely to increase as new production technology is developed.

Crops other than those shown in table 2 are grown in the survey area, but estimated yields are not included because the acreage of these crops is small. The local offices of the Soil Conservation Service and the Cooperative Extension Service can provide information about the management concerns and productivity of the soils for these crops.

Woodland management and productivity

NORMAN W. RUNGE, forester, Soil Conservation Service, assisted in preparing this section.

Trees cover about 72 percent of Marion County. Needleleaf forest types occur most frequently on the uplands and stream terraces, whereas broadleaf types are generally dominant on the bottoms along the rivers and small streams.

Good stands of commercial trees are produced in the woodlands of the county. The value of the wood products is substantial, though it is below its potential. Woodlands also provide areas for grazing, habitat for wildlife, recreation, and natural beauty, and they conserve soil and water. This section explains how soils affect tree growth and management in the county.

Table 3 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Mapping unit symbols for soils suitable for wood crops are listed, and the woodland suitability symbol for each soil is given. All soils bearing the same suitability symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil and the letter *s* indicates sandy texture. The letter *o* indicates insignificant limitations or restrictions. If a soil has more than one limitation, priority in placing the soil into a limitation class is in the following order: w and s.

The third element in the symbol indicates the degree of hazards or limitations and the general suitability of the soils for certain kinds of trees (*8*). The numeral *1* indicates soils that have slight management problems or

none, and are suited to needleleaf trees; *2* indicates soils that have one or more moderate management problems and are suited to needleleaf trees; *3* indicates soils that have one or more severe management problems and are suited to needleleaf trees; *4* indicates soils that have slight management problems, or none, and are suited to broadleaf trees; *5* indicates soils that have one more more moderate management problems and are suited to broadleaf trees; *6* indicates soils that have one or more severe management problems and are suited to broadleaf trees; *7* indicates soils that have slight management problems, or none, and are suited to either needleleaf or boradleaf trees; *8* indicates soils that have one or more moderate management problems and are suited to either needleleaf or broadleaf trees; *9* indicates soils that have one or more severe management problems, and are suited to either needleleaf or broadleaf trees.

In table 3 the soils are also rated for three factors to be considered in management: erosion hazard, equipment limitations, and seedling mortality. *Slight*, *moderate*, and *severe* are used to indicate the degree of major soil limitations.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well-managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if some measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or equipment; *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree that the soil affects expected mortality of planted tree seedlings when plant competition is not a limiting factor. Seedlings from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *important trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Important trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suitable for commercial wood production and that are suited to the soils.

Following are brief descriptions of the woodland suitability groups in Marion County.

Woodland suitability group 1w8. In this group are nearly level, somewhat poorly drained soils on flood plains. Potential productivity is very high. Equipment restrictions are moderate, and seedling mortality is slight to moderate. The soils are suited to broadleaf and needleleaf trees.

Woodland suitability group 1w9. In this group are nearly level, very poorly drained soils that are potentially very highly productive. Seedling mortality and equipment limitations are severe in areas that do not have adequate surface drainage. The soils are suited to broadleaf and needleleaf trees.

Woodland suitability group 2o1. In this group are well drained, nearly level to gently sloping soils that have high potential productivity. These soils have no serious limitations. They are best suited to needleleaf trees.

Woodland suitability group 2o7. In this group are nearly level, well drained soils that have high potential productivity. These soils have no serious limitations. They are suited to needleleaf and broadleaf trees.

Woodland suitability group 2w2. In this group are nearly level, moderately well drained soils that have high productivity. Equipment restrictions are moderate, and seedling mortality is slight to moderate. With adequate surface drainage, the soils are best suited to needleleaf trees.

Woodland suitability group 2w8. In this group are nearly level to gently sloping, moderately well drained to somewhat poorly drained soils that have high potential productivity. Equipment restrictions are moderate, and seedling mortality is slight to moderate. The soils are suited to needleleaf and broadleaf trees.

Woodland suitability group 2w9. In this group are nearly level, poorly drained and very poorly drained soils that have high potential productivity. Seedling mortality and equipment restrictions are severe on areas without adequate surface drainage. The soils are suited to broadleaf and needleleaf trees.

Woodland suitability group 3o1. In this group are nearly level to sloping, well drained soils that have moderately high productivity and no serious management problem. The soils are best suited to needleleaf trees.

Woodland suitability group 3o7. In this group are nearly level, well drained soils that have moderately high productivity and no serious management problem. The soils are suited to needleleaf and broadleaf trees.

Woodland suitability group 3s2. In this group are nearly level to sloping well drained sandy soils that have moderately high productivity. Equipment restrictions and seedling mortality are moderate. The soils are best suited to needleleaf trees.

Woodland suitability group 3w3. In this group are nearly level, poorly drained sandy soils that have a moderately high potential productivity. Equipment restrictions and seedling mortality are severe on areas without adequate surface drainage. The soils are suited to needleleaf trees.

Woodland suitability group 4s2. In this group are nearly level to gently sloping, excessively drained sandy soils that have moderate productivity. Equipment restrictions and seedling mortality are moderate. The soils are best suited to needleleaf trees.

Woodland suitability group 4w2. In this group are nearly level, poorly drained sandy soils that have a hardpan and moderate productivity. Equipment restrictions and seedling mortality are moderate. The soils are best suited to needleleaf trees.

Woodland suitability group 4w3. In this group are nearly level, poorly drained and very poorly drained sandy and organic soils that are moderately productive. Equipment restrictions and seedling mortality are severe. With adequate surface drainage these soils are best suited to needleleaf trees.

Woodland suitability group 5s3. In this group are nearly level to gently sloping, excessively drained sandy soils that have a hardpan. Productivity on these soils is low. Seedling mortality is severe, and equipment restrictions are moderate. The soils are best suited to needleleaf trees.

Woodland yields

Data on growth and yields of unmanaged stands are not a true measure of potential productivity of stands that are managed, but such information permits a comparison of productivity between sites or between species on the same site. Also, by comparing potential yields of wood crops and potential yields of other crops on a site, one can decide the use of land that best meets the objectives.

Average annual growth for managed stands, by site indexes at 50 years, are shown in figures 7 and 8 (*6*, *5*).

Merchantable volumes for loblolly pine plantations, by site indexes at 25 years, are shown in figure 9 (*4*).

Wildlife habitat

WILLIAM W. NEELY, biologist, Soil Conservation Service, assisted in the preparation of this section.

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover, and they affect the construction of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, and water. If any one of these elements is missing, inadequate, or inaccessible, wildlife either are scarce or do not inhabit the area.

If the soils have the potential, wildlife habitat can be created or improved by planting suitable vegetation, by maintaining the existing plant cover, or by helping the natural establishment of desirable plants.

In table 4, the soils in the survey area are rated according to their potential to support the main kinds of wildlife habitat in the area. This information can be used in planning for parks, wildlife refuges, nature study areas, and other developments for wildlife; selecting areas that are suitable for wildlife; selecting soils that are suitable for creating, improving, or maintaining specific elements of wildlife habitat; and determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose. A rating of *fair* means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* means that restrictions for the element of wildlife habitat or kind of wildlife are very severe, and that unsatisfactory results can be expected. Wildlife habitat is impractical or even impossible to create, improve, or maintain on soils having such a rating.

The elements of wildlife habitat are briefly described in the following paragraphs.

Grain and seed crops are seed-producing annuals used by wildlife. Examples are corn, sorghum, wheat, oats, barley, millet, cowpeas, soybeans, and sunflowers. The major soil properties that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations.

Grasses and legumes are domestic perennial grasses and herbaceous legumes that are planted for wildlife food and cover. Examples are fescue, bahiagrass, lovegrass, switchgrass, clover, annual lespedeza, and shrub lespedeza. Major soil properties that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are bluestem, indiangrass, goldenrod, beggarweed, pokeweed, partridgepea, wheatgrass, and fescue. Major soil properties that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations.

Hardwood trees and the associated woody understory provide cover for wildlife and produce nuts or other fruit, buds, catkins, twigs, bark, or foliage that wildlife eat. Examples of native plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, persimmon, sassafras, sumac, hickory, black walnut, blackberry, grape, blackhaw, vibur-

num, blueberry, bayberry, and briers. Examples of fruit-producing shrubs that are commercially available and suitable for planting on soils rated good are pyracantha, autumn-olive, and crabapple. Major soil properties that affect growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness.

Coniferous plants are cone-bearing trees, shrubs, or ground cover plants that furnish habitat or supply food in the form of browse, seeds, or fruitlike cones. Examples are pine, cedar, and ornamental trees and shrubs. Soil properties that have a major effect on the growth of coniferous plants are depth of the root zone, available water capacity, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites, exclusive of submersed or floating aquatics. They produce food or cover for wildlife that use wetland as habitat. Examples of wetland plants are smartweed, wild millet, wildrice, cattail, and rushes, sedges, and reeds. Major soil properties affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, and slope.

Shallow water areas are bodies of water that have an average depth of less than 5 feet and that are useful to wildlife. They can be naturally wet areas, or they can be created by dams or levees or by water-control devices in marshes or streams. Examples are marshes, waterfowl feeding areas, and ponds. Major soil properties affecting shallow water areas are depth to bedrock, wetness, slope, and permeability. The availability of a dependable water supply is important if water areas are to be developed.

The kinds of wildlife habitat are briefly described in the following paragraphs.

Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, dove, meadowlark, field sparrow, killdeer, cottontail rabbit, and red fox.

Woodland habitat consists of areas of hardwoods or conifers, or a mixture of both, and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, woodcock, thrushes, vireos, woodpeckers, squirrels, grey fox, raccoon, and deer.

Wetland habitat consists of open, marshy or swampy, shallow-water areas where water-tolerant plants grow. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, rails, kingfisher, muskrat, mink, and beaver.

Soil properties

CALVIN B. DERRICK, civil engineer, Soil Conservation Service, assisted in preparing this section.

Extensive data about soil properties are summarized on the following pages. The two main sources of these data are the many thousands of soil borings made during the course of the survey and the laboratory analyses of selected soil samples from typical profiles.

In making soil borings during field mapping, soil scientists can identify several important soil properties. They note the seasonal soil moisture condition or the presence of free water and its depth. For each horizon in the profile, they note the thickness and color of the soil material; the texture, or amount of clay, silt, sand, and gravel or other coarse fragments; the structure, or the natural pattern of cracks and pores in the undisturbed soil; and the consistence of the soil material in place under the existing soil moisture conditions. They record the depth of plant roots, determine the pH or reaction of the soil, and identify any free carbonates.

Samples of soil material are analyzed in the laboratory to verify the field estimates of soil properties and to determine all major properties of key soils, especially properties that cannot be estimated accurately by field observation. Laboratory analyses are not conducted for all soil series in the survey area, but laboratory data for many soil series not tested are available from nearby survey areas.

The available field and laboratory data are summarized in tables. The tables give the estimated range of engineering properties, the engineering classification, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Soil test data

Table 5 contains engineering test data for some of the major soil series in Marion County. These tests were made to help evaluate the soils for engineering purposes. Since each soil profile was sampled to a depth of 80 inches or less, the data are not adequate for estimating the characteristics of soil material deeper than 80 inches. The engineering classifications given are based on data obtained by mechanical analyses and by tests to determine liquid limits and plastic limits. The mechanical analyses were made by combined sieve and hydrometer methods.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic. If the moisture content is further increased, the material changes from a plastic to a liquid. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic; and the liquid limit, from a plastic to a liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Engineering properties

Table 6 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 6 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Descriptions of the soils."

Texture is described in table 6 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 5. The estimated classification, without group index numbers, is given in table 6.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

Physical and chemical properties

Table 7 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. The swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations,

basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to soil moisture, particle-size distribution, total acidity, and electrical conductivity of the soil material. The rate of corrosion of concrete is based mainly on the sulfate content, texture, and acidity of the soil. Protective measures for steel or more resistant concrete help to avoid or minimize damage resulting from the corrosion. Uncoated steel intersecting soil boundaries or soil horizons is more susceptible to corrosion than an installation that is entirely within one kind of soil or within one soil horizon.

Erosion factors are used to predict the erodibility of a soil and its tolerance to erosion in relation to specific kinds of land use and treatment. The soil erodibility factor (K) is a measure of the susceptibility of the soil to erosion by water. Soils having the highest K values are the most erodible. K values range from 0.10 to 0.64. To estimate annual soil loss per acre, the K value of a soil is modified by factors representing plant cover, grade and length of slope, management practices, and climate. The soil-loss tolerance factor (T) is the maximum rate of soil erosion, whether from rainfall or soil blowing, that can occur without reducing crop production or environmental quality. The rate is expressed in tons of soil loss per acre per year.

Soil and water features

Table 8 contains information helpful in planning land uses and engineering projects that are likely to be affected by soil and water features.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are placed in one of four groups on the basis of the intake of water after the soils have been wetted and have received precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep to deep, moderately well drained to well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes is not considered flooding. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding and on information that relates the position of each soil on the landscape to historic floods.

High water table is the highest level of a saturated zone more than 6 inches thick for a continuous period of more than 2 weeks during most years. The depth to a seasonal high water table applies to undrained soils. Estimates are based mainly on the relationship between grayish colors or mottles in the soil and the depth to free water observed in many borings made during the course of the soil survey. Indicated are the depth to the seasonal high water table; the kind of water table, that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. Only saturated zones above a depth of 5 or 6 feet are indicated.

Information about the seasonal high water table helps in assessing the need for specially designed foundations, the need for specific kinds of drainage systems, and the need for footing drains to insure dry basements. Such information is also needed to decide whether or not construction of basements is feasible and to determine how septic tank absorption fields and other underground installations will function. Also, a seasonal high water table affects ease of excavation.

Engineering

CALVIN B. DERRICK, civil engineer, Soil Conservation Service, assisted in preparing this section.

This section provides information about the use of soils for building sites, sanitary facilities, construction material, and water management. Among those who can benefit from this section are engineers, landowners, community planners, town and city managers, land developers, builders, contractors, and farmers.

The ratings in the engineering tables are based on test data and estimated data in the "Soil properties" section. The ratings were determined jointly by soil scientists and engineers of the Soil Conservation Service using known relationships between the soil properties and the behavior of soils in various engineering uses.

Among the soil properties and site conditions identified by a soil survey and used in determining the ratings in this section were grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure or aggregation, in-place soil density, and geologic origin of the soil material. Where pertinent, data about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of absorbed cations were also considered.

On the basis of information assembled about soil properties, ranges of values can be estimated for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, shear strength, compressibility, slope stability, and other factors of expected soil behavior in engineering uses. As appropriate, these values can be applied to each major horizon of each soil or to the entire profile.

These factors of soil behavior affect construction and maintenance of roads, airport runways, pipelines, foundations for small buildings, ponds and small dams, irrigation projects, drainage systems, sewage and refuse disposal systems, and other engineering works. The ranges of values can be used to: (1) select potential residential, commercial, industrial, and recreational uses; (2) make preliminary estimates pertinent to construction in a particular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and topsoil; (7) plan farm drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; (8) relate performance of structures already built to the properties of the kinds of soil on which they are built so that performance of similar structures on the same or a similar soil in other locations can be predicted; and (9) predict the trafficability of soils for cross-country movement of vehicles and construction equipment.

Data presented in this section are useful for land-use planning and for choosing alternative practices or general designs that will overcome unfavorable soil properties and minimize soil-related failures. Limitations to the use of these data, however, should be well understood. First, the data are generally not presented for soil material below a depth of 5 or 6 feet. Also, because of the scale of the detailed map in this soil survey, small areas of soils that differ from the dominant soil may be included in mapping. Thus, these data do not eliminate the need for onsite investigations, testing, and analysis by personnel having expertise in the specific use contemplated.

The information is presented mainly in tables. Table 9 shows, for each kind of soil, the degree and kind of limitations for building site development; table 10, for sanitary facilities; and table 12, for water management. Table 11 shows the suitability of each kind of soil as a source of construction materials.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations and to construct interpretive maps for specific uses of land.

Some of the terms used in this soil survey have a special meaning in soil science. Many of these terms are defined in the Glossary.

Building site development

The degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets are indicated in table 9. A *slight* limitation indicates that soil properties are favorable for the specified use; any limitation is minor and easily overcome. A *moderate* limitation indicates that soil properties and site features are unfavorable for the specified use, but the limitations can be overcome or minimized by special planning and design. A *severe* limitation indicates that one or more soil properties or site features is so unfavorable or difficult to overcome that a major increase in construction effort, special design, or intensive maintenance is required. For some soils rated severe, such costly measures may not be feasible.

Shallow excavations are made for pipelines, sewerlines, telephone and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by soil wetness caused by a high seasonal water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of about 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is defined, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 9 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell

potential of the soil. Soil texture, plasticity, and in-place density; potential frost action; soil wetness; and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Slope is an important consideration in the choice of sites for these structures and was considered in determining the ratings. Susceptibility to flooding is a serious limitation.

Local roads and streets referred to in table 9 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. The roads are graded with soil material at hand, and most cuts and fills are less than 6 feet deep.

The load supporting capacity and the stability of the soil as well as the quantity and workability of fill material available are important in design and construction of roads and streets. The classifications of the soil and the soil texture, density, shrink-swell potential, and potential frost action are indicators of the traffic supporting capacity used in making the ratings. Soil wetness, flooding, and slope affect stability and ease of excavation.

Sanitary facilities

Favorable soil properties and site features are needed for proper functioning of septic tank absorption fields, sewage lagoons, and sanitary landfills. The nature of the soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 10 shows the degree and kind of limitations of each soil for such uses and shows the potential of each soil for use as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Excessive slope can cause lateral seepage and the downslope flow of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

In some soils, loose sand is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the effluent, and ground water in the area may be contaminated.

Percolation tests are performed to determine the absorptive capacity of the soil and its suitability for use as septic tank absorption fields. These tests should be performed during the season when the water table is highest and the soil is at minimum absorptive capacity.

On many of the soils that have moderate or severe limitations for use as septic tank absorption fields, a system to lower the seasonal water table could be installed or the size of the absorption field could be increased so that performance is satisfactory.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons have a nearly level floor and cut slopes or embankments of compacted soil material. Aerobic lagoons generally are designed to hold sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Soils that are very high in content of organic matter are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. In soils where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the suitability of sites for sewage lagoons or the cost of construction. Shear strength and permeability of compacted soils affect the performance of embankments.

Sanitary landfill refers to a method of disposing of solid waste by placing refuse in successive layers either in excavated trenches or on the surface of the soil. The waste is spread, compacted, and covered daily with thin layers of soil. Landfill areas are subject to heavy vehicular traffic. Risk of polluting ground water and trafficability affect the suitability of a soil for this use. The best soils have a loamy or silty texture, have moderate to slow permeability, are deep to a seasonal water table, and are not subject to flooding. Clayey soils are likely to be sticky and difficult to spread. Sandy or gravelly soils generally have rapid permeability, which might allow noxious liquids to contaminate ground water. Soil wetness may be a limitation because operating heavy equipment on a wet soil is difficult. Seepage into the refuse increases the risk of pollution of ground water.

In the trench type of landfill, ease of excavation also affects the suitability of a soil for this purpose, so the soil must be deep to bedrock and free of large stones and boulders. Where the seasonal water table is high, water seeps into trenches and causes problems in filling.

Unless otherwise stated, the limitations in table 10 apply only to the soil material within a depth of about 6 feet. If the trench is deeper, a limitation of slight or moderate may not be valid. Site investigation is needed before a site is selected.

Daily cover for landfill should be soil that is easy to excavate and spread over the compacted fill in wet and dry periods. Soils that are loamy or silty and free of stones or boulders are better than other soils. Clayey soils may be sticky and difficult to spread; sandy soils may be subject to soil blowing.

The soils selected for final cover of landfills should be suitable for growing plants. Of all the horizons, the A horizon in most soils has the best workability, more organic matter, and the best potential for growing plants. Thus, for either the area- or trench-type landfill, stockpiling material from the A horizon for use as the surface layer of the final cover is desirable.

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction materials

The suitability of each soil as a source of roadfill, sand, gravel, and topsoil is indicated in table 11 by ratings of good, fair, or poor. The texture, thickness, and organic-matter content of each soil horizon are important factors in rating soils for use as construction materials. Each soil is evaluated to the depth observed, generally about 6 feet.

Roadfill is soil material used in embankments for roads. Soils are evaluated as a source of roadfill for low embankments, which generally are less than 6 feet high and less exacting in design than high embankments. The ratings reflect the ease of excavating and working the material and the expected performance of the material where it has been compacted and adequately drained. The performance of soil after it is stabilized with lime or cement is not considered in the ratings, but information about some of the soil properties that influence such performance is given in the descriptions of the soil series.

The ratings apply to the soil material between the A horizon and a depth of 5 to 6 feet. It is assumed that soil horizons will be mixed during excavation and spreading. Many soils have horizons of contrasting suitability within their profile. The estimated engineering properties in table 6 provide specific information about the nature of each horizon. This information can help determine the suitability of each horizon for roadfill.

Soils rated *good* are coarse grained. They have low shrink-swell potential, low potential frost action, and few cobbles and stones. They are at least moderately well drained and have slopes of 15 percent or less. Soils rated *fair* have a plasticity index of less than 15 and have other limiting features, such as moderate shrink-swell potential, moderately steep slopes, or wetness. If the thickness of suitable material is less than 3 feet, the entire soil is rated *poor*.

Sand is used in great quantities in many kinds of construction. The ratings in table 11 provide guidance as to where to look for probable sources and are based on the probability that soils in a given area contain sizable quantities of sand. A soil rated *good* or *fair* has a layer of suitable material at least 3 feet thick, the top of which is within a depth of 6 feet. Fine-grained soils are not suitable sources of sand.

The ratings do not take into account depth to the water table or other factors that affect excavation of the material. Descriptions of grain size, kinds of minerals, reaction, and stratification are given in the soil series descriptions and in table 6.

Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

The ease of excavation is influenced by the thickness of suitable material, wetness, slopes, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is difficult during most of the year.

Soils rated *fair* are loose sandy soils or firm loamy or clayey soils in which the suitable material is only 8 to 16 inches thick.

Soils rated *poor* are very sandy soils and very firm clayey soils; soils with suitable layers less than 8 inches thick; steep soils; and poorly drained soils.

Although a rating of *good* is not based entirely on high content of organic matter, a surface horizon is generally preferred for topsoil because of its organic-matter content. This horizon is designated as A1 or Ap in the soil series descriptions. The absorption and retention of moisture and nutrients for plant growth are greatly increased by organic matter.

Water management

Many soil properties and site features that affect water management practices have been identified in this soil survey. In table 12 the degree of soil limitation and soil and site features that affect use are indicated for each

kind of soil. This information is significant in planning, installing, and maintaining water control structures.

Soil and site limitations are expressed as slight, moderate, and severe. *Slight* means that the soil properties and site features are generally favorable for the specified use and that any limitation is minor and easily overcome. *Moderate* means that some soil properties or site features are unfavorable for the specified use but can be overcome or modified by special planning and design. *Severe* means that the soil properties and site features are so unfavorable and so difficult to correct or overcome that major soil reclamation, special design, or intensive maintenance is required.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have a low seepage potential, which is determined by permeability and the depth to fractured or permeable bedrock or other permeable material.

Embankments, dikes, and levees require soil material that is resistant to seepage, erosion, and piping and has favorable stability, shrink-swell potential, shear strength, and compaction characteristics. Large stones and organic matter in a soil downgrade the suitability of a soil for use in embankments, dikes, and levees.

Aquifer-fed excavated ponds are bodies of water made by excavating a pit or dugout into a ground-water aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 12 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability, texture, depth to bedrock, hardpan, or other layers that affect the rate of water movement, depth to the water table, slope, stability of ditchbanks, susceptibility to flooding, salinity and alkalinity, and availability of outlets for drainage.

Irrigation is affected by such features as slope, susceptibility to flooding, hazards of water erosion and soil blowing, texture, depth of root zone, rate of water intake at the surface, permeability of the soil below the surface layer, available water capacity, need for drainage, and depth to the water table.

Recreation

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for recreation uses. The ratings are based on such restrictive soil features as flooding, wetness, slope, and texture of the surface layer. Not considered in these ratings, but important in evaluating a site, are location and accessibility of the area, size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites available, and either access to public sewerlines or capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degree, for recreation use by the duration and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 13 can be supplemented by information in other parts of this survey. Especially helpful are interpretations for septic tank absorption fields, given in table 10, and interpretations for dwellings without basements and for local roads and streets, given in table 9.

Camp areas require such site preparation as shaping and leveling for tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils for this use have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing camping sites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for use as picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that will increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones or boulders, is firm after rains, and is not dusty when dry. If shaping is required to obtain a uniform grade, the depth of the soil over bedrock or hardpan should be enough to allow necessary grading.

Paths and trails for walking, horseback riding, bicycling, and other uses should require little or no cutting and filling. The best soils for this use are those that are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once during the annual period of use. They should have moderate slopes and have few or no stones or boulders on the surface.

Formation, morphology, and classification of soils

This section tells how the factors of soil formation affected the development of soils in Marion County. It tells how and why soils are classified. The current system of soil classification is explained, and each soil series in the county is placed in classes of this system.

Factors of soil formation

Soil is the product of soil-forming processes acting on accumulated or deposited geologic materials. The five important factors in soil formation are parent material, climate, living organisms (plants and animals), relief, and time.

Climate and living organisms are the active forces of soil formation. Their effect on the parent material is modified by relief and by the length of time the parent material has been in place. The relative importance of each factor differs from place to place. In some places one factor dominates in the formation and fixes most of the properties of the soil. In most areas the interaction of all five factors determines what kind of soil is formed.

Although soil formation is complex, some understanding of the soil-forming processes may be gained by considering each of the five factors separately. It must be remembered, however, that each of the five factors is affected by and also affects each of the other factors.

Parent material

Parent material is the unconsolidated mass from which a soil is formed. It has much to do with the mineral and chemical composition of the soils. In Marion County the parent materials of the soils are marine or fluvial deposits. These deposits have varying amounts of sand, silt, and clay.

There are five terrace formations in this county that were deposited and formed during the Pleistocene or glacial epoch (*3*). These are the Sunderland, the Wicomico, the Penholoway, the Talbot, and the Pamlico Formations.

The Sunderland terrace is from about 100 feet to 170 feet above sea level. In Marion County, however, the highest elevation is about 125 feet. An area in the north-central part of the county adjoining the Marion-Dillon County line is on this terrace. Dothan, Fuquay, Blanton, Goldsboro, Persanti, Smithboro, Coxville, Pantego, and Rutlege soils are the principal soils that formed in this material.

The Wicomico terrace is from about 70 feet to 100 feet above sea level. It consists of a large area between Marion and Mullins and south to Rains and Ariel Crossroads and smaller areas in the vicinity of Sellers and northwest of Nichols. Dothan, Fuquay, Blanton, Centenary, Foreston, Goldsboro, Duplin, Dunbar, Coxville, Rains, and Pantego soils are the principal soils that formed in this material.

The Penholoway terrace is from about 42 feet to 70 feet above sea level. It consists of a large area of stream terrace soils west and south of Marion and also the upper flood plains of the Great Pee Dee, Little Pee Dee, and Lumber Rivers. Smithboro, Persanti, Cantey, Byars, and Lakeland are the dominant soils in most of this area, but Tawcaw, Chastain, Johnston, and Rutlege soils are dominant on the flood plains.

The Talbot terrace is from about 25 feet to 42 feet above sea level. It consists of areas of stream terrace soils in the lower half of the county and the flood plains of the Great Pee Dee and Little Pee Dee Rivers in the central portion of the county. Cantey, Byars, Paxville, Smithboro, Persanti, Eunola, and Lakeland soils are dominant on the stream terraces, and Tawcaw, Chastain, Johnston, and Rutlege soils are dominant on the flood plains.

The Pamlico terrace has a shoreline less than 25 feet above sea level. It consists of the flood plains of the Great Pee Dee and Little Pee Dee Rivers in about the southern third of the county. Tawcaw, Chastain, Johnston, and Rutlege soils are the principal soils that formed in this material.

Climate

Marion County has a temperate climate, and rainfall is well distributed throughout the year. Because the climate is fairly uniform, it does not account for significant differences among the soils. Temperature and precipitation are discussed in the section "Additional facts about the county."

Climate, particularly precipitation and temperature, affects the physical, chemical, and biological relationship in the soil. Water dissolves minerals, aids chemical and biological activity, and transports the dissolved mineral and organic material through the soil profile. Large amounts of rainwater promote leaching of the soluble bases and the translocation of the less soluble and finer textured soil material downward through the soil profile. The amount of water that percolates through the soil depends on the amount of rainfall, the length of the frost-free season, relief, and the permeability of the soil material.

Parent material weathers more rapidly in moist conditions and warm temperatures. The growth and activity of living organisms is also increased by a warm, humid climate. Thus, the abundant rainfall, warm temperatures, and long freeze-free growing season of Marion County have had a marked effect on the soils, both directly and indirectly, through some of the other factors that affect them.

Plants and animals

The number and kinds of plants and animals that live in and on the soil are determined mainly by the climate, but, to a lesser extent, by parent material, relief, and the age of the soil.

Bacteria, fungi, and other micro-organisms are indispensable in soil formation. They hasten the weathering of minerals and the decomposing of organic matter. Larger plants alter the soil microclimate, furnish organic matter, and transfer chemical elements from the subsoil to the surface soil.

Most of the fungi, bacteria, and other micro-organisms in the soils of Marion County are in the upper few inches of the soil. The activity of earthworms and other small invertebrates is mainly in the A horizon and upper part of the B horizon, where these organisms slowly but continuously mix the soil material. Bacteria and fungi decompose organic matter and release nutrients for plant use.

Although animals play a secondary role in soil formation, their influence is very great. By eating plants they perform one step in returning plant material to the soil.

In Marion County the native vegetation in the better drained areas was mainly loblolly pine, longleaf pine, oak, and hickory. In the wetter areas it was mainly sweetgum, blackgum, yellow-poplar, maple, ash, tupelo, and cypress. Large trees affect soil formation by bringing nutrients up from deep in the soil, by bringing soil material up from varying depths when the trees are blown over, and by providing large openings to be filled by material from above as large roots decay.

Relief

Relief, or lay of the land, influences soil formation by its effect on moisture, temperature, and erosion. Because of this influence, several different kinds of soil may form from similar parent material. Most of Marion County is nearly level to gently sloping. There are, however, three general landscapes in the county that affect the formation of soils. These landscapes are described as follows:

1. Nearly level to gently sloping landscapes moderately dissected by streams. The soils are mostly well drained and deep.
2. Broad, slightly dissected, nearly level areas between streams. Most of the soils have a yellow to gray color and many are distinctly mottled. They are deep and moderately well drained to poorly drained.
3. Areas on stream bottoms and low terraces. The soils in these areas are young, are predominantly gray, and have poorly defined genetic layers.

Time

The length of time required for a soil to develop depends mostly on the intensity of other soil-forming factors. The soils of Marion County range from immature, or young, to mature. On the higher elevations of the uplands most of the soils have well-developed horizons that are easily recognized. However, where the parent materials are very sandy, little horizonation has taken place; and where the relief is very low and the soils are permanently saturated, horizons are only moderately distinct. On the first bottoms of the streams, the soil material has not been in place long enough for soil horizons to form.

Morphology

If a vertical cut is dug into a soil, several layers or horizons are evident. The differentiation of horizons is the result of many soil-forming processes. These include the accumulation of organic matter; the leaching of soluble salts; the reduction and translocation of iron; the formation of soil structure; physical weathering, as by freezing and thawing; and the chemical weathering of primary minerals or rocks.

Some of these processes are continually taking place in all soils, but the number of active processes and the degree of their activity vary from one soil to another.

Most soils contain three major horizons called A, B, and C (7). These major horizons may be further subdivided by the use of subscripts and letters to indicate changes within one horizon. An example would be the B2t horizon that represents a layer within the B horizon with translocated clay illuviated from the A horizon.

The A horizon is the surface layer. The layer with the largest accumulation of organic matter is called an A1 horizon. If the soils are cleared and plowed, the plow layer becomes an Ap horizon. The Lynchburg and Coxville soils are examples of soils that have a distinctive, dark-colored A1 or Ap horizon. The A horizon is also the layer of maximum leaching, or eluviation, of clay and iron. When considerable leaching has taken place, an A2 horizon is formed just below the surface layer. Normally, it is the lightest colored horizon in the soil. It is well defined in such soils as Dothan and Fuquay soils.

The B horizon lies below the A horizon and is commonly called the subsoil. It is the horizon of maximum accumulation, or illuviation, of clay, iron, aluminum, or other compounds leached from the A horizon. Dothan, Varina, and Summerton soils are among the soils that have a well-defined B horizon.

The C horizon is below the A and B horizons. Some soils, such as Lakeland and Rutlege soils, do not have a B horizon, and the C horizon lies immediately under the A horizon. The C horizon consists of materials that are little altered by the soil forming processes but may be modified by weathering.

Well drained and moderately well drained soils in Marion County have a yellowish brown or reddish subsoil horizon. These colors are mainly due to thin coatings of iron oxides on the sand, silt, and clay particles. A soil is considered well drained if it is free of gray (chroma 2 or less) mottles to a depth of at least 30 inches below the surface. Among the well drained soils in this county are Dothan, Summerton, and Fuquay soils. Moderately well drained soils are wet for short periods and are generally free of gray (chroma 2 or less) mottles to a depth of about 15 to 20 inches. Goldsboro and Persanti soils are examples of moderately well drained soils.

The reduction and transfer of iron is associated with the wetter, more poorly drained soils. This process is called gleying. Poorly to very poorly drained soils, such as the Coxville and Pantego soils, have a subsoil and under-

lying material that are grayish colored, indicating reduction and transfer of iron. Moderately well drained to somewhat poorly drained soils have yellowish brown and gray mottles indicating the segregation of iron. Lynchburg and Smithboro soils are among the somewhat poorly drained soils in this county.

Classification

The system of soil classification currently used was adopted by the National Cooperative Soil Survey in 1965. Readers interested in further details about the system should refer to the latest literature available (*9*).

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are observable in the field or from the combined data of soil science and other disciplines. The properties selected for the higher categories are the result of soil genesis or of factors that affect soil genesis. In table 14, the soils of the survey area are classified according to the system. Categories of the system are discussed in the following paragraphs.

ORDER. Ten soil orders are recognized as classes in the system. The properties used to differentiate among orders are those that reflect the kind and degree of dominant soil-forming processes that have taken place. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders based primarily on properties that influence soil genesis and are important to plant growth or that are selected to reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of expression of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and a prefix that suggests something about the properties of the soil. An example is Hapludults (*Hapl*, meaning simple horizons, plus *udult*, the suborder of Ultisols that have a udic moisture regime).

SUBGROUP. Each great group may be divided into three subgroups: the central (typic) concept of the great groups, which is not necessarily the most extensive subgroup; the intergrades, or transitional forms to other orders, suborders, or great groups; and the extragrades, which have some properties that are representative of the great groups but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceeding the name of the great group. The adjective *Typic* identifies for the subgroup that is thought to typify the great group. An example is Typic Hapludult.

FAMILY. Families are established within a subgroup on the basis of similar physical and chemical properties that affect management. Among the properties considered in horizons of major biological activity below plow depth are particle-size distribution, mineral content, temperature regime, thickness of the soil penetrable by roots, consistence, moisture equivalent, soil slope, and permanent cracks. A family name consists of the name of a subgroup and a series of adjectives. The adjectives are the class names for the soil properties used as family differentiae. An example is fine-loamy, siliceous, thermic, Typic Hapludults.

SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Additional facts about the county

The climate, physiography, drainage, and geology of Marion County are discussed in this section.

Climate

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Marion County has a subtropical climate with warm summers, mild winters, and ample precipitation. Except in the summer, when maritime tropical air persists in the area for extended periods, the day-to-day weather is largely controlled by the generally west-to-east motion of pressure systems and fronts. Rainfall is abundant, averaging about 45 inches per year and remaining in the range of 38 to 53 inches six years in 10. Precipitation of one-tenth inch or more falls on an average of 74 days a year. The annual distribution shows a maximum of about 6 inches in July and a minimum of about 2 1/2 inches in January. The period April to September, which includes the growing season for most crops, receives an average of 27 inches of rain (60 percent of the annual total). Additional temperature and precipitation data, as recorded at Marion, Marion County, during the period 1949-1973, is given in table 15.

The prevailing wind is southwesterly at 7 miles per hour. Average windspeed tends to be highest in April—9 miles per hour. Relative humidity in midafternoon averages about 45 percent in the spring and about 54 percent at other times. The average maximum humidity, usually observed at dawn, is 87 percent. Heavy fog occurs about 25 days each year. The sun is visible during about 65 percent of the daylight hours in summer, and during about 55 percent in winter. Clear days, sunrise to sunset,

number about 110 annually. The average evaporation rate (pan measured) is in the range of 55 to 60 inches per year.

Summers are long, warm, and moist. Maximum daily temperatures tend to hover at or above 90 degrees F, and minimum daily temperatures tend to range between 65 and 70 degrees. Temperatures in excess of 100 degrees are usually recorded on a few days each year; the highest temperature on record, 108 degrees, was recorded in June 1954. The abundant supply of warm, moist, relatively unstable air which is drawn into the area each summer produces frequent showers and thunderstorms. Thunderstorms number about 53 each year, with an average of 13 occurring in July. Hailstorms are infrequent and usually of little consequence. Tropical storms can occur during summer, but they rarely do.

Autumn tends to be warm and pleasant. The average date of the first freezing temperature in the fall is October 26; however, 2 years in 10 it is as early as October 21. Tropical storms or hurricanes occasionally bring heavy rains and strong winds to the area in this season.

Winters are mild and relatively dry, accounting for only about 18 percent of the average annual precipitation. Average daily maximum and minimum temperatures are about 58 and 35 degrees respectively, yielding an average winter temperature of about 47 degrees. Freezing temperatures occur on fewer than half of the winter days. The coldest temperature on record, 6 degrees was recorded in December 1962. Winter precipitation usually comes in the form of rain. Snowfall is rare, and snow seldom remains on the ground more than one day. The number of snow days varies greatly from year to year. In about half of the winters there is no measurable snowfall, and significant amounts fall only about once in four years. Though rare, heavy snowfalls sometimes occur. The worst snowstorm on record, in February 1973, left more than 17 inches of snow on the ground. Freezing rain or glaze is usually observed on a few days each winter, and occasionally an icestorm creates serious road hazards and causes property damage.

Spring is a season of rapid transition in temperature and moisture conditions between a rather uniform winter and a uniform summer. March is typically a month of heavy, steady rains as well as warming temperatures. Later, as spring gives way to summer, scattered thunderstorm activity begins. This is the season when locally severe weather is most likely. Though the tornado season is roughly March through August in this region, tornados can occur in any month and are most likely to occur in April.

Table 16 shows the probabilities of last freezing temperatures in spring and first in fall. The average length of the freeze-free growing season is approximately 240 days. Growing degree-days, which are equivalent to 'heat units,' are tabulated in table 15. Beginning in spring, growing degree-days accumulate by the amount that the average temperature each day exceeds a base temperature (in this case, 50 degrees). The normal monthly accumulation is used to schedule single or successive plantings of a crop within the limits of the freeze-free season extending from the last freeze in spring to the first freeze in fall. In March, growing degree-days begin to accumulate rapidly. Annual growing degree-days average 5,400.

Physiography, drainage, and geology

Marion County is made up of two broad, physiographic areas. They are the Southern Coastal Plain and the Atlantic Coast Flatwoods. The soils of both areas are sedimentary and were transported from other areas by the ocean or streams and deposited in their present position.

The northern part of the county, mainly from Catfish Canal to the flood plains of the Little Pee Dee River and south to Centenary, is in the Southern Coastal Plain area. In this area the land is predominantly nearly level to gently sloping, with the stronger slopes adjacent to the streams and drainageways. Drainage is generally good; however, many shallow, oval-shaped depressions lack natural surface outlets. They are commonly known as Carolina bays, and they vary in size from a few acres to over 1,000 acres.

The western and southern parts of the county are in the Atlantic Coast Flatwoods area. The soils in this area are predominantly nearly level and moderately well drained to very poorly drained. There are some broad areas of excessively drained sandy soils generally adjacent to the flood plains of the rivers. There are large, flat areas of somewhat poorly to very poorly drained soils. Broad areas of nearly level flood plains occur along the major streams.

The elevation of Marion County ranges from a high of about 125 feet above sea level in the northern part of the county near the Dillon County line to a low of less than 20 feet above sea level in the lower flood plains of the Great Pee Dee and Little Pee Dee Rivers.

The Great Pee Dee River forms the western boundary of Marion County. The Lumber River forms the northeastern boundary of the county, and it flows into the Little Pee Dee River which forms the eastern boundary. The Little Pee Dee River joins the Great Pee Dee River at the southern tip of the county. The main tributaries to these rivers are Tobys Creek, Pitch Pot Swamp, Catfish Creek, Smith Swamp, Bull Swamp, Maple Swamp, Cypress Creek, Reedy Creek, Back Swamp, White Oak Creek, Maiden Down Swamp, Buck Swamp, Briar Creek, and Crutchlow Branch. These rivers and their tributaries form a branching pattern and flow mainly in a southeasterly direction.

The geology of Marion County is characteristic of the Atlantic Coastal Plain. There are four geologic formations in the county. They were deposited at different periods during the alternating transgression and recession of the ocean (*3*). These formations are the Black Creek Formation of Upper Cretaceous age, underlying the entire upper part of the county; the Peedee Formation, of Upper Cretaceous age, near the surface in the lower part

of the county; the Duplin Marl, underlying an area in the center of the county between Mullins and Gresham; and relatively thin deposits of Pleistocene age overlying the above three formations. These Pleistocene deposits underlie five different terraces in Marion County. They are the Sunderland Terrace that has an elevation of 100 to 170 feet above sea level; the Wicomico Terrace, 70 to 100 feet; the Penholoway Terrace, 42 to 70 feet; the Talbot Terrace, 25 to 42 feet; and the Pamlico Terrace that has an elevation of less than 25 feet above sea level.

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Glossary

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	More than 9

Bisequel. See sequum.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coat, clay skin.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically for long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are

commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients, as for example in "hillpeats" and "climatic moors."

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; *November-May*, for example, means that flooding can occur during the period November through May. Water standing for short periods after rainfall or commonly covering swamps and marshes is not considered flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Gleyed soil. A soil having one or more neutral gray horizons as a result of waterlogging and lack of oxygen. The term "gleyed" also designates gray horizons and horizons having yellow and gray mottles as a result of intermittent waterlogging.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major horizons of mineral soil are as follows:

O horizon.—An organic layer, fresh and decaying plant residue, at the surface of a mineral soil.

A horizon.—The mineral horizon, formed or forming at or near the surface, in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon most of which was originally part of a B horizon.

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Horizon, argillic. A subsurface horizon into which clay has moved. It has about 20 percent more clay than the horizon above. The presence of clay films on ped surfaces and in soil pores is evidence of clay movement.

Horizon, spodic. A subsurface horizon in which amorphous materials consisting of organic matter plus compounds of aluminum and, usually, iron have accumulated.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Leaching. The removal of soluble material from soil or other material by percolating water.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is greater than that of organic soil.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material mixed with mineral soil material. The content of organic matter is more than 20 percent.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Permeability. The quality that enables the soil to transmit water or air, measured as the number of inches per hour that water moves through the soil. Terms describing permeability are *very slow* (less than 0.06 inch), *slow* (0.06 to 0.20 inch), *moderately slow* (0.2 to 0.6 inch), *moderate* (0.6 to 2.0 inches), *moderately rapid* (2.0 to 6.0 inches), *rapid* (6.0 to 20 inches), and *very rapid* (more than 20 inches).

Piping. Formation by moving water of subsurface tunnels or pipelike cavities in the soil.

Plastic limit. The moisture content at which a soil changes from a semisolid to a plastic state.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents that commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on exposure to repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade, whereas ironstone cannot be cut but can be broken or shattered with a spade. Plinthite is one form of the material that has been called laterite.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Runoff. The precipitation discharged in stream channels from a drainage area. The water that flows off the land surface without sinking in is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage. The rapid movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. If two sequa are present in a single soil profile it is said to have a bisequum.

Series, soil. A group of soils, formed from a particular type of parent material, having horizons that, except for the texture of the A or surface horizon, are similar in all profile characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineralogical and chemical composition.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Soil. A natural, three-dimensional body at the earth's surface that is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in mature soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristics of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates that are separated from adjoining aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil (engineering). Presumably a fertile soil or soil material, or one that responds to fertilization, ordinarily rich in organic matter, used to topdress roadbanks, lawns, and gardens.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Illustrations

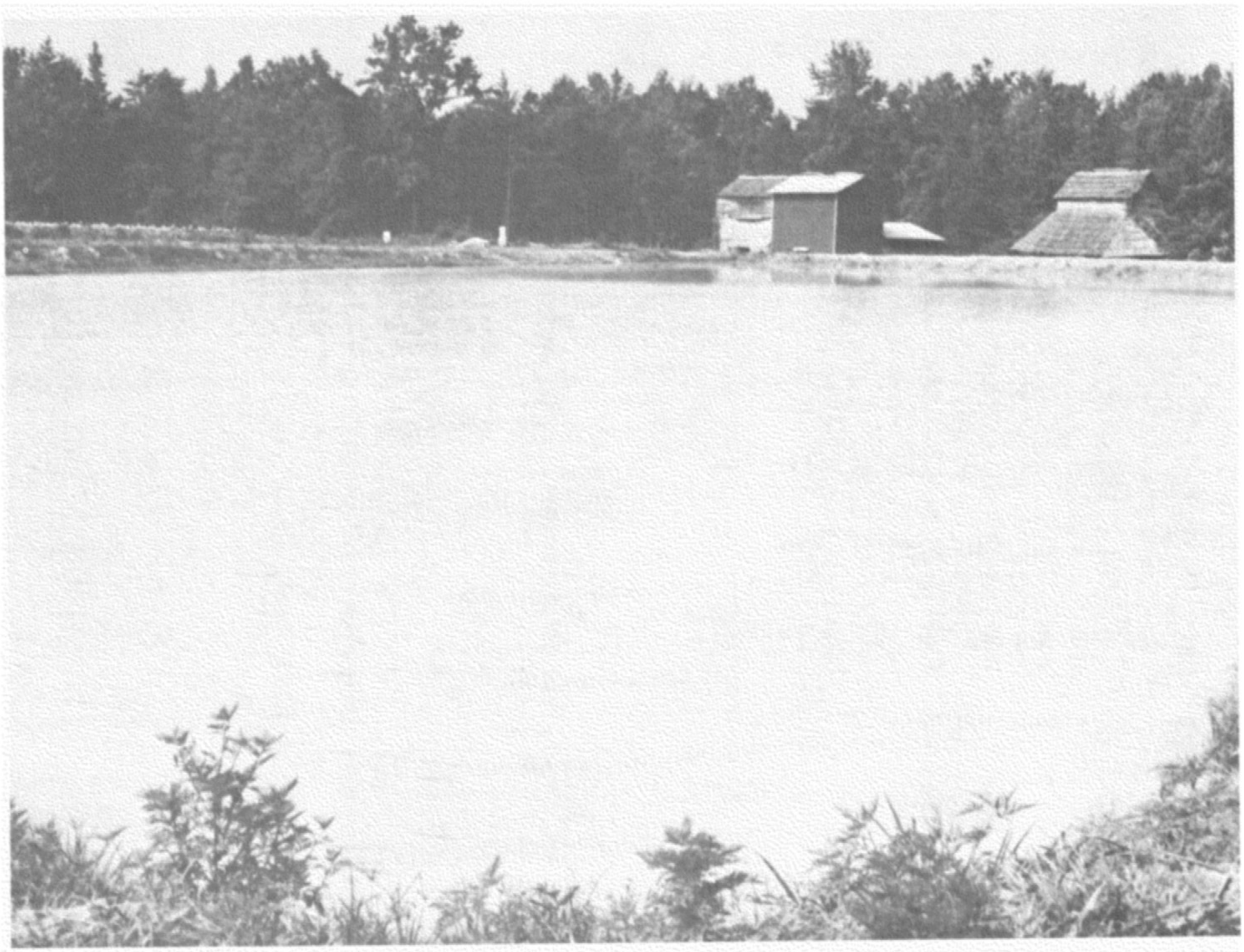

Figure 1.—Excavated pond in an area of Coxville fine sandy loam. It is used for fish production and supplies water for irrigation.

Figure 2.—This recently thinned plantation of pines is on Centenary sand.

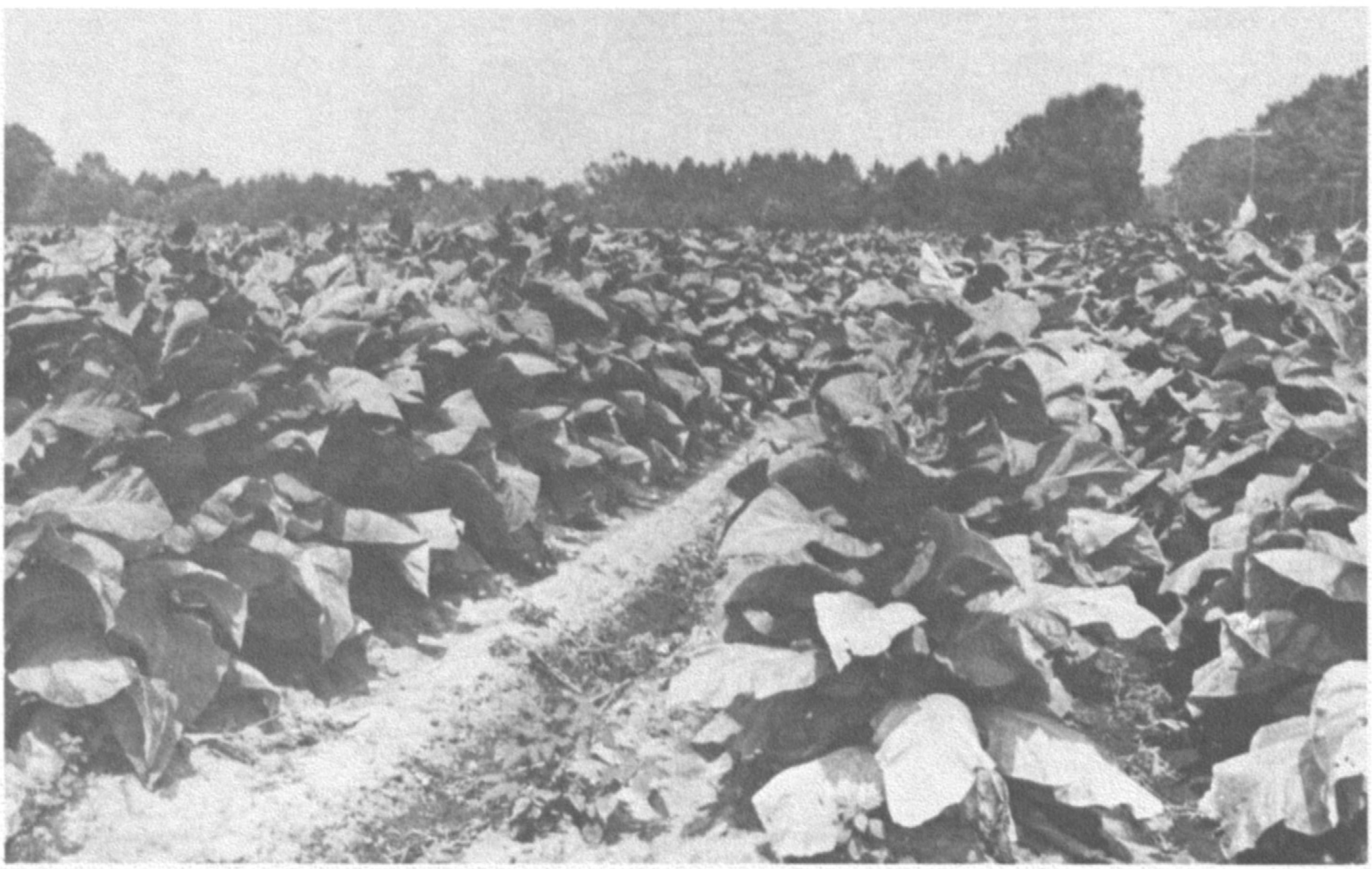

Figure 3.—This tobacco is on Goldsboro loamy fine sand, 0 to 2 percent slopes. If this soil is adequately drained, tobacco yields are high.

Figure 4.—This Coastal bermudagrass for hay is on Pocalla sand, 0 to 2 percent slopes.

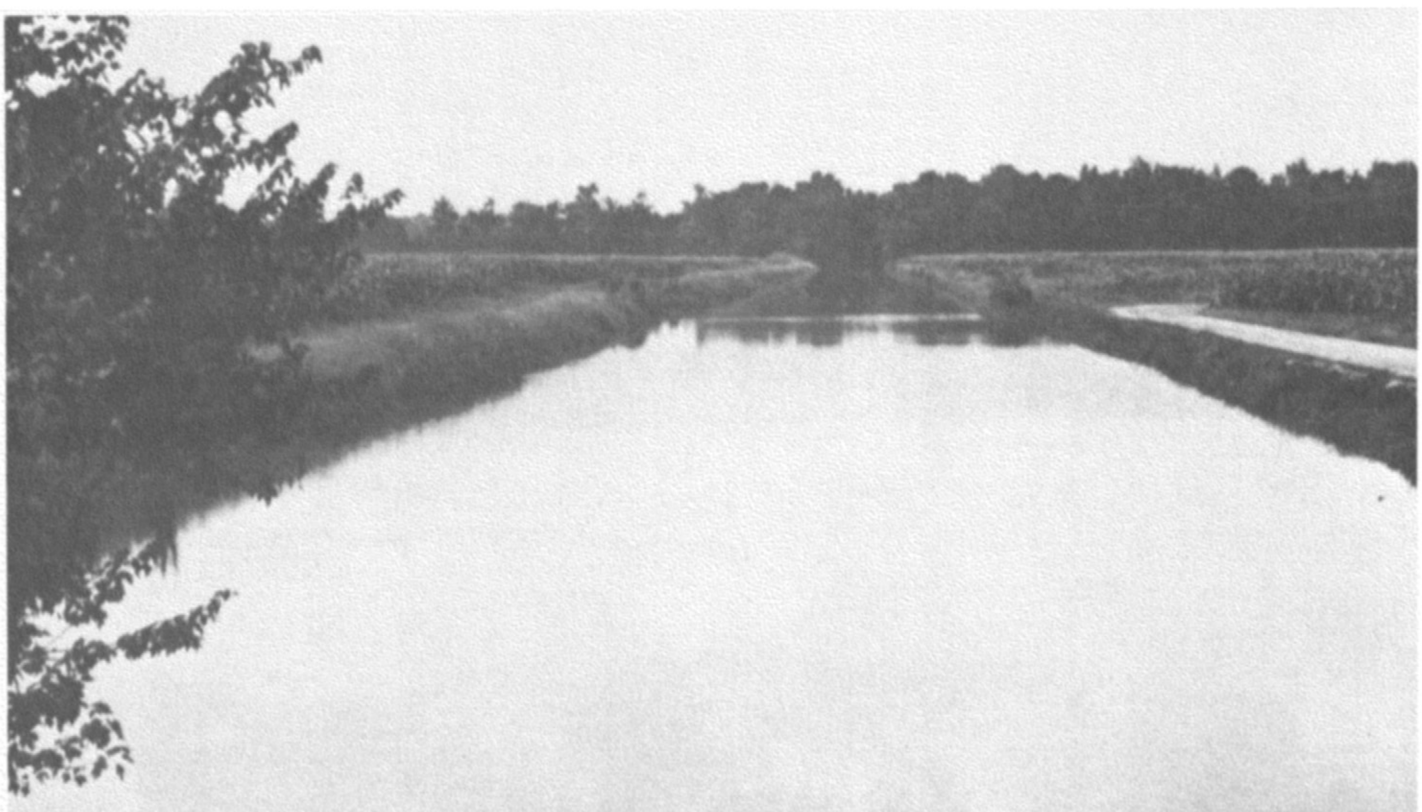

Figure 5.—This irrigation reservoir is in an area of Ponzer soils.

Figure 6.—This field of soybeans was planted with minimum tillage in wheat stubble on Goldsboro loamy fine sand, 0 to 2 percent slopes. This practice conserves soil, moisture, and labor.

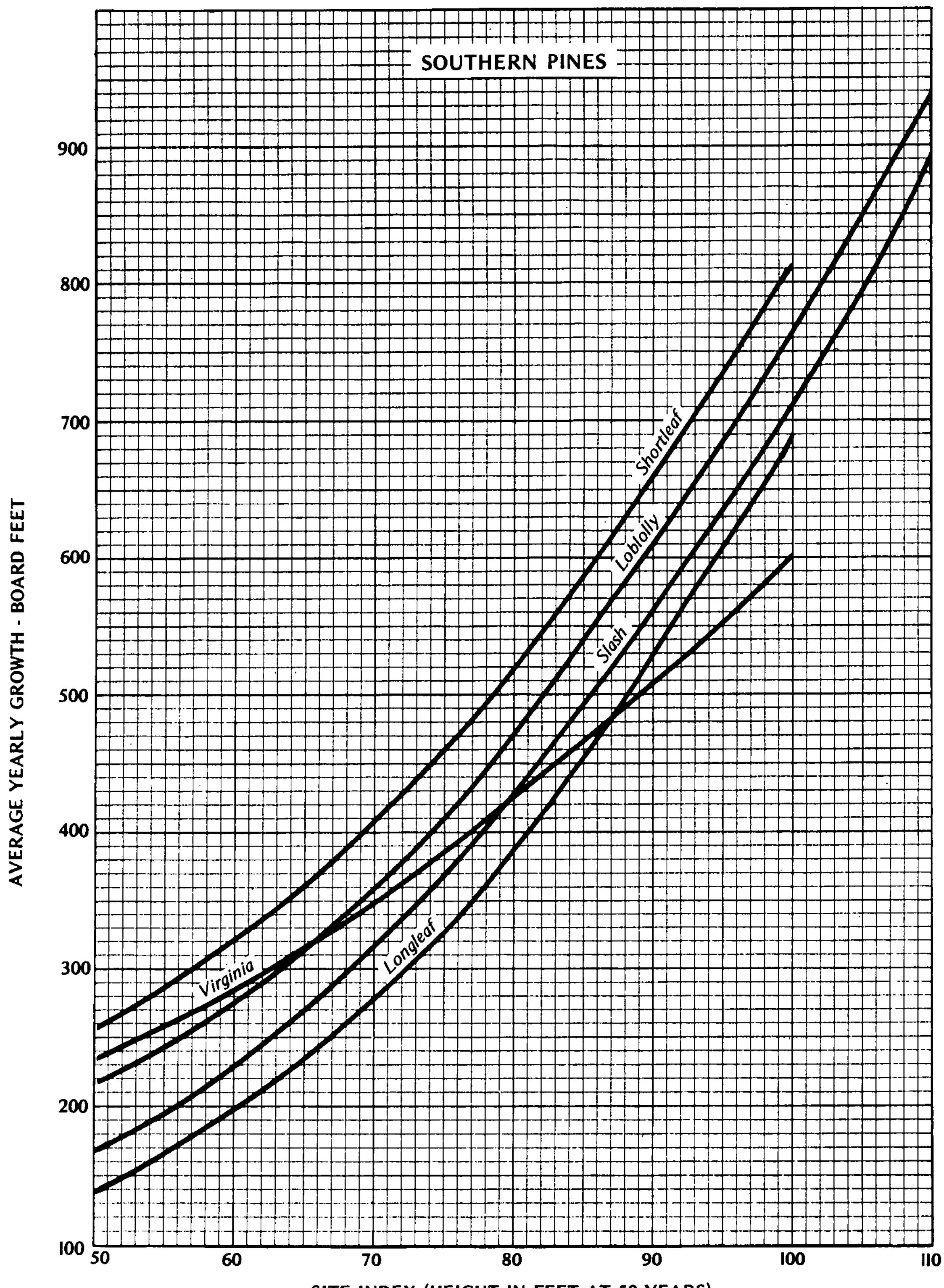

Figure 7.—Average yearly growth per acre in board feet for well-stocked, even-aged, managed stands of southern pines to age 50. (Scribner log rule.)

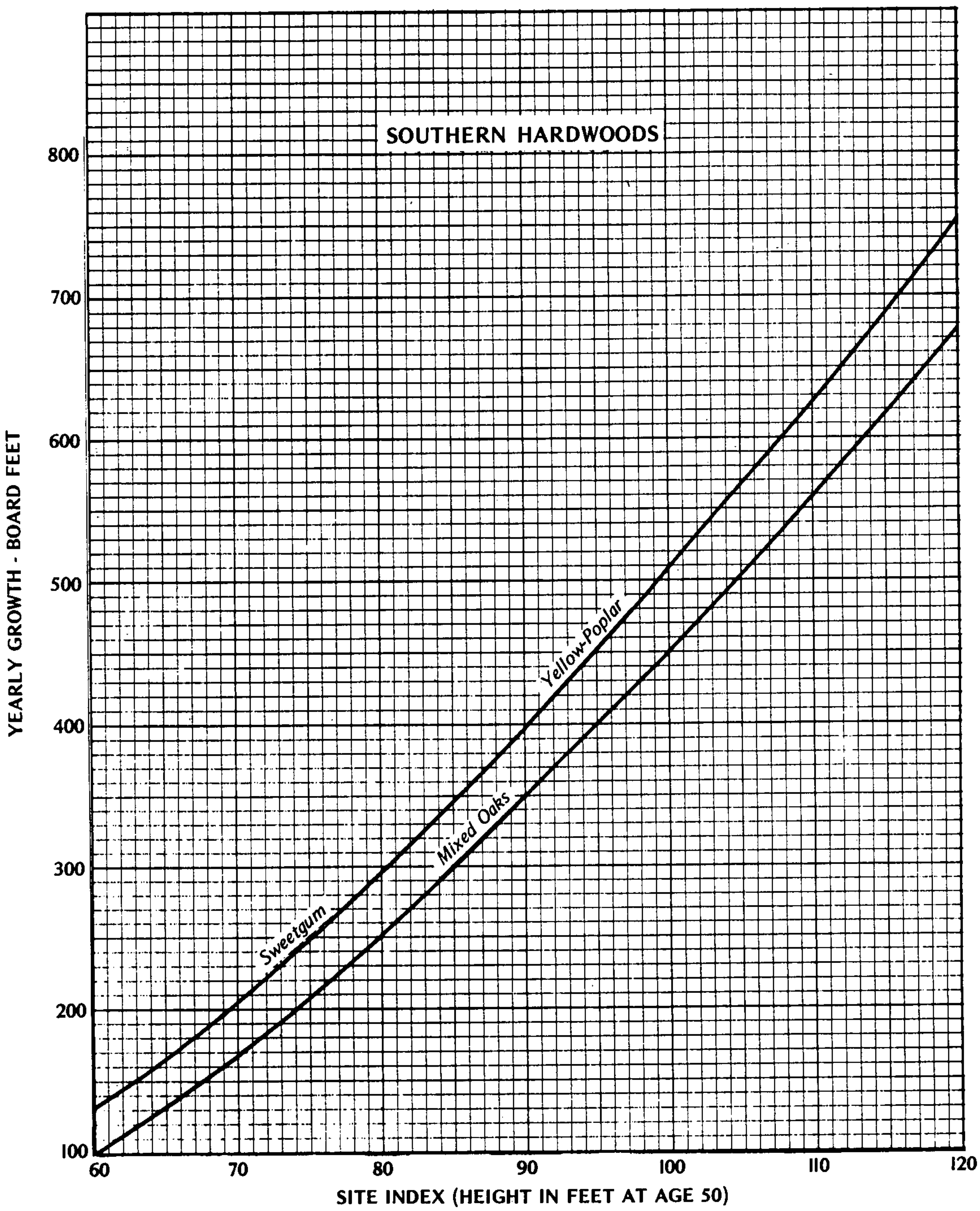

Figure 8.—Average yearly growth per acre in board feet for well-stocked, even-aged, managed stands of southern hardwoods to age 50. (Scribner log rule.)

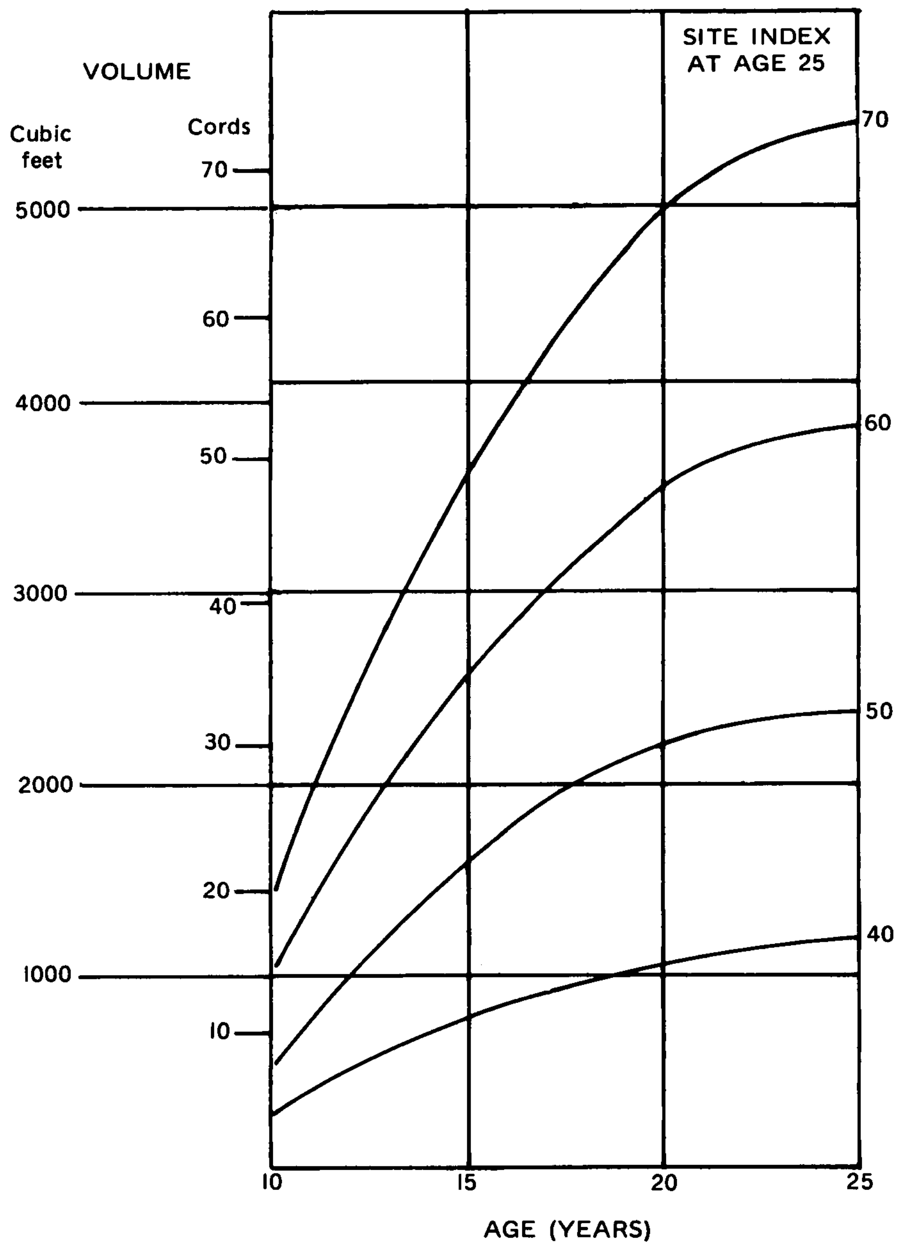

Figure 9.—Merchantable volume (inside bark) to a 3-inch top per acre for loblolly pine plantations by site (indexes) at age 25. (700 trees per acre; conversion factor of 73 cubic feet per cord)

Tables

TABLE 1.--APPROXIMATE ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
BaB	Blanton sand, 0 to 6 percent slopes	5,385	1.7
Bp	Borrow pits	275	0.1
BrA	Brogdon sand, 0 to 2 percent slopes	750	0.2
By	Byars loam	8,250	2.7
CaA	Cahaba loamy sand, 0 to 2 percent slopes	1,150	0.4
Cn	Cantey loam	41,325	13.5
Ct	Centenary sand	5,460	1.8
Cx	Coxville fine sandy loam	17,990	5.9
DaA	Dothan loamy fine sand, 0 to 2 percent slopes	15,325	5.0
DaB	Dothan loamy fine sand, 2 to 6 percent slopes	1,075	0.3
Dn	Dunbar loamy sand	3,985	1.3
DuA	Duplin fine sandy loam, 0 to 2 percent slopes	3,985	1.3
EuA	Eunola loamy sand, 0 to 2 percent slopes	2,525	0.8
Fo	Foreston loamy sand	4,500	1.5
FuB	Fuquay sand, 0 to 6 percent slopes	10,025	3.3
FuC	Fuquay sand, 6 to 10 percent slopes	270	0.1
GoA	Goldsboro loamy fine sand, 0 to 2 percent slopes	6,700	2.2
HwA	Hiwassee fine sandy loam, 0 to 2 percent slopes	380	0.1
JN	Johnston association, frequently flooded	14,800	4.8
KnB	Kenansville sand, 0 to 4 percent slopes	575	0.2
LaB	Lakeland sand, 0 to 6 percent slopes	30,985	10.1
Le	Leon sand	2,500	0.8
Lm	Lumbee sandy loam	1,995	0.6
Ln	Lynchburg sandy loam	3,000	1.0
Ly	Lynn Haven sand	3,850	1.2
Os	Osier loamy sand	1,750	0.6
Pa	Pantego loam	9,850	3.2
Pb	Paxville loam	4,000	1.3
PeA	Persanti fine sandy loam, 0 to 2 percent slopes	10,500	3.4
PeB	Persanti fine sandy loam, 2 to 6 percent slopes	975	0.3
PoA	Pocalla sand, 0 to 2 percent slopes	1,550	0.5
PZ	Ponzer soils	5,500	1.8
Ra	Rains sandy loam	3,870	1.3
RnB	Rimini sand, 0 to 6 percent slopes	250	0.1
Ru	Rutlege loamy sand	15,750	5.1
Sm	Smithboro silt loam	20,000	6.5
SuA	Summerton fine sandy loam, 0 to 2 percent slopes	1,200	0.4
SuB	Summerton fine sandy loam, 2 to 6 percent slopes	1,200	0.4
SuC	Summerton fine sandy loam, 6 to 10 percent slopes	650	0.2
TC	Tawcaw-Chastain association, frequently flooded	38,645	12.6
VaA	Varina fine sandy loam, 0 to 2 percent slopes	1,300	0.4
VaB	Varina fine sandy loam, 2 to 6 percent slopes	250	0.1
	Water	2,700	0.9
	Total	307,000	100.0

TABLE 2.--ESTIMATED ACRE YIELDS OF CROPS AND PASTURE PLANTS

[Yields are those that can be expected under a high level of management. The estimates were made in 1974. Absence of data indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Tobacco	Corn	Cotton	Soybeans	Oats	Improved bermuda-grass	Bahiagrass
	Lb	Bu	Lb	Bu	Bu	AUM[1]	AUM[1]
Blanton:							
BaB	2,000	60	500	25	55	8.0	8.0
Borrow pits:							
Bp	---	---	---	---	---	---	---
Brogdon:							
BrA	2,400	90	700	35	75	10.0	9.0
Byars:							
By	---	110	---	40	65	---	10.5
Cahaba:							
CaA	2,600	90	800	35	75	10.0	8.5
Cantey:							
Cn	---	85	---	35	55	---	8.5
Centenary:							
Ct	2,000	65	550	30	55	7.5	7.5
Coxville:							
Cx	---	85	450	40	70	---	9.0
Dothan:							
DaA	2,800	90	800	40	80	10.5	8.0
DaB	2,600	80	750	35	75	10.5	8.0
Dunbar:							
Dn	2,600	100	600	45	75	10.0	9.0
Duplin:							
DuA	2,800	110	750	45	85	10.5	9.0
Eunola:							
EuA	2,800	100	700	35	85	10.5	9.0
Foreston:							
Fo	2,600	90	700	35	80	10.0	8.5
Fuquay:							
FuB	2,200	80	650	30	60	9.0	8.0
FuC	---	60	500	20	45	8.0	7.0
Goldsboro:							
GoA	3,000	125	700	45	85	10.5	9.0
Hiwassee:							
HwA	2,500	95	800	40	85	10.0	9.0
Johnston:							
JN	---	---	---	---	---	---	---
Kenansville:							
KnB	2,000	70	550	30	60	9.0	7.5
Lakeland:							
LaB	---	55	---	20	---	7.0	7.0
Leon:							
Le	---	50	---	---	---	---	7.0
Lumbee:							
Lm	---	110	---	40	70	---	10.0

See footnote at end of table.

TABLE 2.--ESTIMATED ACRE YIELDS OF CROPS AND PASTURE PLANTS--Continued

Soil name and map symbol	Tobacco	Corn	Cotton	Soybeans	Oats	Improved bermuda-grass	Bahiagrass
	Lb	Bu	Lb	Bu	Bu	AUM[1]	AUM[1]
Lynchburg:							
Ln	2,800	115	675	45	75	---	10.0
Lynn Haven:							
Ly	---	---	---	---	---	---	8.5
Osier:							
Os	---	---	---	---	---	---	---
Pantego:							
Pa	---	115	---	45	70	---	10.5
Paxville:							
Pb	---	110	---	40	70	---	10.5
Persanti:							
PeA	2,400	100	700	40	85	9.0	8.0
PeB	2,200	90	650	35	75	9.0	8.0
Pocalla:							
PoA	2,000	75	600	30	60	9.0	8.0
Ponzer:							
PZ	---	100	---	40	75	---	---
Rains:							
Ra	2,300	110	450	40	70	---	10.0
Rimini:							
RnB	---	---	---	---	---	---	---
Rutlege:							
Ru	---	---	---	---	---	---	---
Smithboro:							
Sm	---	90	---	40	65	---	9.0
Summerton:							
SuA	2,200	100	850	40	75	10.0	9.0
SuB	2,000	90	800	35	70	10.0	9.0
SuC	---	80	700	30	---	9.0	8.0
Tawcaw:							
TC:[2]							
Tawcaw part	---	---	---	---	---	---	---
Chastain part	---	---	---	---	---	---	---
Varina:							
VaA	2,400	100	850	40	75	10.0	8.5
VaB	2,400	100	850	40	70	10.0	8.5

[1]Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.
[2]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 3.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column indicates that the information was not available]

Soil name and map symbol	Suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Blanton:							
BaB	3s2	Slight	Moderate	Moderate	Slash pine	80	Slash pine.
					Loblolly pine	80	
					Longleaf pine	70	
Brogdon:							
BrA	2o1	Slight	Slight	Slight	Loblolly pine	86	Loblolly pine,
					Slash pine	86	slash pine.
Byars:							
By	2w9	Slight	Severe	Severe	Loblolly pine	95	Loblolly pine,
					Sweetgum	90	slash pine,
					Water tupelo	90	water tupelo,
					Slash pine	92	American sycamore.
					Water oak	90	
Cahaba:							
CaA	2o7	Slight	Slight	Slight	Loblolly pine	90	Loblolly pine,
					Slash pine	90	slash pine,
					Yellow-poplar	90	yellow-poplar,
					Sweetgum	85	cherrybark oak.
					Southern red oak	80	
					White oak	80	
					Cherrybark oak	90	
Cantey:							
Cn	2w9	Slight	Severe	Severe	Loblolly pine	90	Loblolly pine,
					Slash pine	90	slash pine,
					Sweetgum	85	sweetgum.
					Water oak	---	
Centenary:							
Ct	2w2	Slight	Moderate	Moderate	Slash pine	85	Slash pine,
					Loblolly pine	86	loblolly pine.
					Longleaf pine	72	
Coxville:							
Cx	2w9	Slight	Severe	Severe	Loblolly pine	90	Loblolly pine,
					Slash pine	90	slash pine,
					Longleaf pine	71	sweetgum,
					Sweetgum	90	American sycamore.
					Water oak	90	
					Willow oak	---	
Dothan:							
DaA, DaB	2o1	Slight	Slight	Slight	Slash pine	90	Slash pine,
					Loblolly pine	90	loblolly pine,
					Longleaf pine	70	longleaf pine.
Dunbar:							
Dn	2w8	Slight	Moderate	Moderate	Loblolly pine	90	Loblolly pine,
					Slash pine	85	slash pine,
					Longleaf pine	70	yellow-poplar,
					Water oak	---	sweetgum.
					Blackgum	---	
					Yellow-poplar	---	
					Sweetgum	90	
Duplin:							
DuA	2w8	Slight	Moderate	Moderate	Loblolly pine	90	Loblolly pine,
					Slash pine	90	slash pine,
					Sweetgum	90	yellow-poplar,
					Blackgum	---	American sycamore,
					Southern red oak	---	sweetgum.
					White oak	---	
					Yellow-poplar	---	

TABLE 3.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Eunola:							
EuA	2w8	Slight	Moderate	Slight	Loblolly pine	90	Loblolly pine, slash pine, sweetgum, yellow-poplar.
					Slash pine	90	
					Sweetgum	90	
Foreston:							
Fo	2w2	Slight	Moderate	Slight	Slash pine	90	Slash pine, loblolly pine.
					Loblolly pine	90	
					Longleaf pine	75	
Fuquay:							
FuB, FuC	3s2	Slight	Moderate	Moderate	Loblolly pine	83	Slash pine, longleaf pine.
					Slash pine	83	
					Longleaf pine	67	
Goldsboro:							
GoA	2w8	Slight	Moderate	Slight	Loblolly pine	90	Loblolly pine, slash pine, yellow-poplar, American sycamore, sweetgum.
					Slash pine	93	
					Longleaf pine	77	
					Sweetgum	90	
					Southern red oak	---	
					White oak	---	
Hiwassee:							
HwA	3o7	Slight	Slight	Slight	Loblolly pine	80	Loblolly pine, slash pine, yellow-poplar.
					Slash pine	80	
					Longleaf pine	65	
Johnston:							
JN	1w9	Slight	Severe	Severe	Loblolly pine	97	Loblolly pine, slash pine, bald cypress, yellow-poplar, sweetgum, green ash, water tupelo.
					Sweetgum	111	
					Water oak	103	
					Water tupelo	---	
					Bald cypress	---	
					Red oaks	---	
					White oaks	---	
					Green ash	---	
Kenansville:							
KnB	3s2	Slight	Moderate	Moderate	Loblolly pine	80	Loblolly pine, slash pine.
					Longleaf pine	65	
Lakeland:							
LaB	4s2	Slight	Moderate	Moderate	Slash pine	75	Slash pine, loblolly pine.
					Loblolly pine	75	
					Longleaf pine	60	
Leon:							
Le	4w2	Slight	Moderate	Moderate	Loblolly pine	75	Slash pine, loblolly pine.
					Slash pine	75	
					Longleaf pine	70	
Lumbee:							
Lm	2w9	Slight	Severe	Severe	Loblolly pine	94	Loblolly pine, slash pine, sweetgum, water tupelo.
					Slash pine	91	
					Pond pine	75	
					Sweetgum	90	
					Water tupelo	70	
					White oak	---	
Lynchburg:							
Ln	2w8	Slight	Moderate	Slight	Slash pine	91	Slash pine, loblolly pine, American sycamore, sweetgum.
					Loblolly pine	86	
					Longleaf pine	74	
					Yellow-poplar	92	
					Sweetgum	90	
					Southern red oak	---	
					White oak	---	
					Blackgum	---	

TABLE 3.—WOODLAND MANAGEMENT AND PRODUCTIVITY—Continued

Soil name and map symbol	Suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Lynn Haven: Ly	4w3	Slight	Severe	Severe	Pond pine	60	Slash pine, loblolly pine.
Osier: Os	3w3	Slight	Severe	Severe	Slash pine Loblolly pine Longleaf pine Sweetgum Water oak	80 80 68 80 80	Slash pine, loblolly pine, longleaf pine.
Pantego: Pa	1w9	Slight	Severe	Severe	Loblolly pine Slash pine Pond pine Baldcypress Water tupelo Water oak	98 95 73 --- --- ---	Loblolly pine, slash pine, sweetgum, American sycamore, water tupelo.
Paxville: Pb	1w9	Slight	Severe	Severe	Loblolly pine Slash pine Pond pine Water oak Water tupelo Baldcypress	96 92 77 90 --- ---	Loblolly pine, slash pine, American sycamore, water tupelo.
Persanti: PeA, PeB	2w8	Slight	Moderate	Moderate	Loblolly pine Shortleaf pine Water oak Sweetgum	90 80 90 90	Loblolly pine, slash pine, sweetgum, yellow-poplar.
Pocalla: PoA	3s2	Slight	Moderate	Moderate	Loblolly pine Slash pine Longleaf pine	80 80 70	Loblolly pine, slash pine, longleaf pine.
Ponzer: PZ	4w3	Slight	Severe	Severe	Slash pine Pond pine Water tupelo Baldcypress	70 60 --- ---	Slash pine, loblolly pine.
Rains: Ra	2w9	Slight	Severe	Severe	Loblolly pine Slash pine Sweetgum	94 91 90	Loblolly pine, slash pine, sweetgum, American sycamore.
Rimini: RnB	5s3	Slight	Severe	Severe	Loblolly pine Slash pine Longleaf pine	65 65 55	Slash pine, longleaf pine, sand pine.
Rutlege: Ru	2w9	Slight	Severe	Severe	Loblolly pine Slash pine	86 86	Loblolly pine, slash pine, water tupelo.
Smithboro: Sm	2w8	Slight	Moderate	Moderate	Loblolly pine Slash pine Sweetgum	86 85 90	Loblolly pine, slash pine, American sycamore, sweetgum.
Summerton: SuA, SuB, SuC	3o1	Slight	Slight	Slight	Loblolly pine Slash pine Longleaf pine	80 80 65	Loblolly pine, slash pine.

TABLE 3.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Suitability group	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Important trees	Potential productivity: Site index	Trees to plant
Tawcaw:							
TC:[1]							
Tawcaw part	1w8	Slight	Moderate	Moderate	Loblolly pine	100	Loblolly pine, eastern cottonwood, American sycamore, sweetgum, water oak, cherrybark oak.
					Sweetgum	100	
					Water oak	90	
					Water tupelo	---	
Chastain part	2w9	Slight	Severe	Severe	Sweetgum	94	Loblolly pine, American sycamore, sweetgum, cherrybark oak.
					Water oak	89	
					Eastern cottonwood	90	
					Green ash	88	
					Loblolly pine	90	
					Water tupelo	---	
					White oak	---	
					Southern red oak	---	
					Baldcypress	---	
Varina:							
VaA, VaB	3o1	Slight	Slight	Slight	Slash pine	85	Slash pine, loblolly pine.
					Loblolly pine	85	
					Longleaf pine	70	

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 4.--WILDLIFE HABITAT POTENTIAL

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Blanton: BaB	Poor	Fair	Fair	Poor	Fair	Very poor	Very poor	Fair	Fair	Very poor
Borrow pits: Bp.										
Brogdon: BrA	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Byars: By	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good
Cahaba: CaA	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Cantey: Cn	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good
Centenary: Ct	Poor	Fair	Fair	Poor	Fair	Poor	Very poor	Fair	Fair	Very poor
Coxville: Cx	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good
Dothan: DaA, DaB	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Dunbar: Dn	Good	Good	Good	Good	Good	Poor	Fair	Good	Good	Poor
Duplin: DuA	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Eunola: EuA	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Foreston: Fo	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Fuquay: FuB, FuC	Fair	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
Goldsboro: GoA	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Hiwassee: HwA	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor
Johnston: JN	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
Kenansville: KnB	Fair	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
Lakeland: LaB	Poor	Fair	Fair	Poor	Fair	Very poor	Very poor	Fair	Fair	Very poor

TABLE 4.--WILDLIFE HABITAT POTENTIAL--Continued

Soil name and map symbol	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
Leon: Le	Poor	Poor	Poor	Poor	Fair	Poor	Fair	Poor	Fair	Poor
Lumbee: Lm	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good	Fair
Lynchburg: Ln	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair
Lynn Haven: Ly	Very poor	Very poor	Very poor	Very poor	Very poor	Good	Good	Very poor	Very poor	Good
Osier: Os	Very poor	Poor	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair
Pantego: Pa	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good
Paxville: Pb	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good
Persanti: PeA, PeB	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor
Pocalla: PoA	Fair	Fair	Good	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor
Ponzer: PZ	Very poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good
Rains: Ra	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good	Good
Rimini: RnB	Very poor	Very poor	Poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor	Very poor
Rutlege: Ru	Very poor	Poor	Poor	Fair	Fair	Good	Good	Poor	Fair	Fair
Smithboro: Sm	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair
Summerton: SuA, SuB	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
SuC	Fair	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor
Tawcaw: TC:[1] Tawcaw part	Very poor	Poor	Poor	Good	Fair	Fair	Fair	Poor	Fair	Fair
Chastain part	Very poor	Poor	Poor	Fair	Poor	Good	Good	Poor	Fair	Good
Varina: VaA, VaB	Good	Good	Good	Good	Good	Poor	Very poor	Good	Good	Very poor

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 5.--ENGINEERING TEST DATA

[Tests performed by the S.C. State Highway Department in cooperation with the U.S. Department of Commerce, Bureau of Public Roads, according to standard procedures of the American Association of State Highway and Transportation Officials (AASHTO)]

Soil name and location	South Carolina Report No.	Depth	Mechanical Analysis-1/ Percentage passing sieve-2/ No. 60 (0.25 mm)	No. 200 (0.074 mm)	Percentage smaller than 0.005 mm	Liquid limit	Plasticity index	Classification 3/ AASHTO	4/ Unified
		In							
Cantey loam;									
2.75 miles northeast of	I-26570	0-5	87	64	42	5/	5/	A-4(6)	ML
Marion, 0.75 miles north of	I-26571	15-50	100	91	75	51	19	A-7-5(14)	MH
intersection of woods road	I-26572	50-75	99	93	76	55	20	A-7-5(15)	MH
and S.C. Secondary Road 38;									
50 feet west of woods road.									
Duplin fine sandy loam;									
3.0 miles northeast of	I-26579	0-7	65	40	21	5/	5/	A-4(1)	SM
Marion, 150 feet west of S.C.	I-26580	7-14	81	66	53	37	14	A-6(8)	CL
Highway 41-A.	I-26581	50-62	72	55	44	40	15	A-6(6)	CL
Fuquay sand;									
1.0 mile southeast of Smith-	I-26567	11-28	93	16	7	5/	5/	A-2-4(0)	SM
boro, 2,500 feet south of	I-26568	28-49	94	38	32	30	8	A-4(1)	SC
S.C. Highway 917, 300 feet	I-26569	49-80	88	43	39	31	9	A-4(2)	SC
west of dirt road.									
Persanti fine sandy loam;									
2.5 miles southwest of	I-26582	0-5	94	64	31	5/	5/	A-4(6)	ML
Marion, 0.5 mile southwest of	I-26583	8-23	100	81	58	39	12	A-6(9)	ML
intersection of S.C. Second-	I-26584	36-62	98	84	65	48	15	A-7-5(12)	ML
ary Roads 25 and 34, 200 feet									
southeast of Road 25.									
Smithboro silt loam;									
2.0 miles west of Marion, 400	I-26564	0-6	95	77	34	5/	5/	A-4(8)	ML
feet north of U.S. Highway 76	I-26565	17-31	100	87	60	40	17	A-7-6(11)	CL
(Old River Terrace)	I-26566	62-75	98	78	52	40	17	A-6(11)	CL
Smithboro silt loam;									
7.0 miles north of Marion,	I-26585	0-6	90	74	41	5/	5/	A-4(8)	ML
3,400 feet west of inter-	I-26586	16-40	97	90	63	39	12	A-6(9)	ML
section of S.C. Secondary	I-26587	40-56	96	87	64	42	16	A-7-6(11)	ML
Roads 502 and 242, 150 feet									
north of Road 242.									
Varina fine sandy loam;									
1.7 miles southeast of	I-26576	0-8	91	40	13	5/	5/	A-4(1)	SM
Sellers, 200 feet west of	I-26577	12-25	96	63	43	32	11	A-6(6)	CL
S.C. Secondary Road 263.	I-26578	42-64	95	61	48	45	12	A-7-5(4)	ML

1/Mechanical analysis according to AASHTO Designation: T 88-57 (1). Results by this procedure may differ somewhat from results obtained by the soils survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method, and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

2/100 percent of all samples passed sieve No. 10 (2.0 mm).

3/Based on AASHTO Designation M145-49(1).

4/Based on the Unified Soil Classification System (2).

5/Nonplastic.

TABLE 6.--ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than and > means more than. Absence of an entry indicates that data were not estimated or were not available]

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Blanton: BaB	0-60	Sand	SP-SM	A-3, A-2	100	100	85-100	5-12	---	NP
	60-80	Sandy clay loam, sandy loam.	SC, SM-SC	A-4, A-2	100	100	85-95	30-50	18-30	4-10
Borrow pits: Bp.										
Brogdon: BrA	0-17	Sand	SM, SP-SM	A-2	100	98-100	65-90	10-20	---	NP
	17-35	Sandy loam	SM, SM-SC	A-2, A-4	100	98-100	65-90	25-40	<30	NP-7
	35-58	Loamy sand, loamy fine sand, sand.	SM, SP-SM	A-2	100	96-100	60-90	10-30	---	NP
	58-75	Sandy loam, sandy clay loam, sandy clay.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	100	96-100	55-95	30-55	20-40	4-20
Byars: By	0-9	Loam	ML, CL-ML	A-4	100	100	70-95	51-85	<30	NP-7
	9-73	Clay, clay loam, silty clay loam silty clay.	CL, CH	A-7	100	100	90-100	60-95	41-75	17-42
Cahaba: CaA	0-12	Loamy sand	SM	A-4, A-2	95-100	95-100	65-90	30-45	---	NP
	12-42	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-4, A-6	90-100	80-100	75-90	40-75	22-35	8-15
	42-72	Sand, loamy sand, fine sandy loam.	SM, SP-SM	A-2	95-100	90-100	60-85	10-35	---	NP
Cantey: Cn	0-7	Loam	ML, CL-ML	A-4, A-6	98-100	98-100	85-98	51-80	<40	NP-13
	7-75	Clay, sandy clay, silty clay, silty clay loam, clay loam.	CL, ML, MH	A-6, A-7	98-100	98-100	90-100	55-95	35-60	12-25
Centenary: Ct	0-9	Sand	SP, SP-SM	A-3	100	100	60-90	4-10	---	NP
	9-36	Sand, fine sand	SP-SM	A-3	100	100	65-90	5-10	---	NP
	36-72	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2	100	100	60-90	3-20	---	NP
Coxville: Cx	0-7	Fine sandy loam	SM, ML, CL-ML	A-4	100	100	85-97	40-60	<35	NP-6
	7-72	Clay loam, sandy clay, clay.	CL	A-6, A-7	100	100	90-98	53-80	30-50	15-35
Dothan: DaA, DaB	0-16	Loamy fine sand	SM	A-2	95-100	92-100	60-80	13-30	---	NP
	16-40	Sandy clay loam, sandy loam.	SM-SC, SC, SM	A-2, A-4, A-6	95-100	92-100	68-90	23-45	<40	NP-15
	40-75	Sandy clay loam, sandy clay.	SM-SC, SC	A-2, A-4, A-6, A-7	95-100	92-100	70-95	30-50	25-45	4-18
Dunbar: Dn	0-11	Loamy sand	SM	A-2	100	100	40-90	20-35	---	NP
	11-72	Clay loam, sandy clay, clay.	CL, CH	A-6, A-7	100	100	85-95	51-70	35-55	15-25

TABLE 6.—ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS—Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Percentage passing sieve number— 4	10	40	200	Liquid limit	Plasticity index
	In								Pct	
Duplin:										
DuA	0-7	Fine sandy loam	SM, ML, SM-SC	A-2, A-4	100	100	67-98	24-58	<30	NP-7
	7-80	Sandy clay, clay loam, clay.	CL	A-6, A-7	100	98-100	80-100	51-82	30-50	13-25
Eunola:										
EuA	0-9	Loamy sand	SM, SP-SM	A-2	100	98-100	50-80	10-25	---	NP
	9-25	Sandy clay loam	SM, SC, ML, CL	A-4	100	98-100	80-95	36-60	15-30	2-10
	25-50	Sandy loam	SM	A-2, A-4	100	98-100	60-70	30-40	---	NP
	50-75	Sand, loamy sand	SM, SP-SM	A-2, A-3	100	98-100	50-75	5-30	---	NP
Foreston:										
Fo	0-15	Loamy sand	SM	A-2	100	100	60-100	15-30	---	NP
	15-41	Sandy loam, fine sandy loam	SM	A-2	100	100	70-100	18-35	<25	NP-4
	41-72	Loamy fine sand, loamy sand, fine sand.	SP-SM, SM	A-2, A-3	100	100	50-98	6-25	---	NP
Fuquay:										
FuB, FuC	0-28	Sand	SP-SM, SM	A-2, A-3	95-100	90-100	50-95	5-20	---	NP
	28-49	Sandy loam, sandy clay loam	SM, SC, SM-SC	A-2, A-4	95-100	90-100	60-96	30-45	<35	NP-10
	49-80	Sandy clay loam, sandy clay	SC, CL	A-2, A-4, A-6	95-100	90-100	60-90	30-55	20-35	8-15
Goldsboro:										
GoA	0-12	Loamy fine sand	SM, SM-SC, SC	A-2, A-4	90-100	85-100	50-95	15-45	<25	NP-14
	12-75	Sandy clay loam, sandy loam.	SM-SC, SC, CL-ML, CL	A-2, A-4, A-6	98-100	95-100	60-95	25-55	16-35	4-16
Hiwassee:										
HwA	0-6	Fine sandy loam	SM, SM-SC	A-2, A-4	100	95-100	75-95	30-50	<35	NP-7
	6-66	Clay, clay loam	ML, CL	A-6, A-7	100	100	90-100	60-80	30-48	11-21
	66-80	Sandy clay loam, sandy loam	SM, SM-SC, SC, ML, CL, CL-ML	A-2, A-4, A-6	95-100	90-100	75-90	30-70	<40	NP-15
Johnston:										
JN	0-35	Fine sandy loam	SM, SM-SC	A-2, A-4	100	100	60-80	30-50	<25	NP-7
	35-70	Sand, fine sand, loamy sand.	SM, SP-SM	A-2	100	100	50-75	5-30	---	NP
Kenansville:										
KnB	0-25	Sand	SP-SM, SM	A-2, A-3	100	95-100	50-70	10-20	---	NP
	25-38	Sandy loam	SM, SM-SC	A-2	100	95-100	50-65	20-35	<30	NP-6
	38-75	Sand, loamy sand	SP-SM, SM	A-2, A-3, A-1	100	95-100	40-60	5-20	---	NP
Lakeland:										
LaB	0-28	Sand	SP-SM	A-3, A-2	90-100	90-100	60-100	5-12	---	NP
	28-80	Sand, fine sand	SP, SP-SM	A-3, A-2	90-100	90-100	50-100	1-12	---	NP
Leon:										
Le	0-22	Sand	SP, SP-SM	A-3, A-2	100	100	80-100	2-12	---	NP
	22-34	Sand, loamy sand	SM, SP-SM	A-3, A-2	100	100	80-100	5-20	---	NP
	34-60	Sand, fine sand	SP, SP-SM	A-3, A-2	100	100	80-100	2-12	---	NP
Lumbee:										
Lm	0-7	Sandy loam	SM	A-2, A-4	100	85-100	65-90	15-45	---	NP
	7-37	Sandy clay loam, sandy loam.	SC, SM-SC	A-4, A-6, A-2	100	90-100	65-95	30-49	19-35	4-15
	37-72	Sand, loamy sand	SP, SM, SP-SM	A-2, A-3	90-100	85-100	65-90	4-25	---	NP

TABLE 6.—ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS—Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number—				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Lynchburg: Ln	0-9	Sandy loam	SM, SM-SC	A-2, A-4	100	100	75-98	30-50	<30	NP-7
	9-72	Sandy clay loam, sandy loam, clay loam.	SM-SC, SC, CL, CL-ML	A-2, A-4, A-6	100	100	70-100	25-60	15-40	4-18
Lynn Haven: Ly	0-14	Sand	SP, SP-SM	A-3, A-2	100	100	80-100	2-12	---	NP
	14-32	Sand, loamy sand	SM, SP-SM	A-3, A-2	100	100	80-100	5-20	---	NP
	32-70	Sand, fine sand	SP, SP-SM	A-3, A-2	100	100	80-100	2-12	---	NP
Osier: Os	0-5	Loamy sand	SM, SP-SM	A-2, A-3	100	100	65-90	5-25	---	NP
	5-70	Sand	SM, SP-SM	A-2, A-3	100	100	65-90	5-15	---	NP
Pantego: Pa	0-12	Loam	SM, SM-SC, ML, CL-ML	A-4	100	100	80-95	40-75	<30	NP-7
	12-72	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-4, A-6	100	95-100	80-100	36-80	25-40	8-16
Paxville: Pb	0-18	Loam	SM, SM-SC, ML, CL-ML	A-4	100	100	80-98	40-60	<30	NP-7
	18-42	Sandy clay loam, sandy loam.	CL-ML, CL, SM-SC, SC	A-2, A-4, A-6	100	98-100	60-98	30-60	25-40	5-15
	42-72	Sandy loam, loamy sand, fine sand.	SM, SP-SM, SP	A-2, A-3	100	98-100	60-98	4-35	<30	NP-4
Persanti: PeA, PeB	0-8	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-4	100	95-100	80-98	40-65	<35	NP-7
	8-75	Clay, silty clay, silty clay loam, clay loam.	CL, ML, CH, MH	A-6, A-7	100	98-100	90-100	65-95	35-60	12-30
Pocalla: PoA	0-23	Sand	SP-SM, SM	A-2, A-3	100	100	50-70	5-20	---	NP
	23-36	Sandy loam	SM	A-2	100	100	50-75	15-30	<25	NP-4
	36-46	Sand, loamy sand	SP-SM, SM	A-2, A-3	100	100	50-75	5-20	---	NP
	46-72	Sandy clay loam, sandy loam.	SM-SC, SC, SM	A-2, A-4, A-6	100	100	60-80	30-50	15-35	3-15
Ponzer: PZ	0-41	Muck	Pt						---	NP
	41-72	Sandy loam, loam, sandy clay loam, clay loam.	ML, CL, SC	A-4, A-6	100	100	85-95	40-80	30-40	10-15
Rains: Ra	0-8	Sandy loam	SM, SM-SC	A-2, A-4	100	95-100	50-85	25-50	<35	NP-7
	8-50	Sandy clay loam, clay loam.	SC, SM-SC, CL, CL-ML	A-2, A-4, A-6	100	98-100	65-98	30-70	18-40	4-18
	50-72	Sandy clay loam, clay loam, sandy clay.	SC, SM-SC, CL, CL-ML	A-4, A-6, A-7	100	98-100	65-98	36-72	18-45	4-22
Rimini: RnB	0-40	Sand	SP, SP-SM	A-3	100	98-100	60-98	2-5	---	NP
	40-61	Sand, fine sand	SP, SP-SM	A-3	100	98-100	75-100	3-10	---	NP
	61-80	Sand, fine sand	SP, SP-SM	A-3	100	98-100	75-100	2-5	---	NP
Rutlege: Ru	0-12	Loamy sand	SM, SP-SM	A-2	100	100	50-75	10-25	---	NP
	12-60	Sand	SP-SM, SM, SP	A-2, A-3	100	100	50-70	3-15	---	NP

TABLE 6.--ESTIMATED ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Smithboro:										
Sm	0-6	Silt loam	ML, CL, CL-ML	A-4	100	100	85-100	51-80	<35	NP-10
	6-75	Clay, clay loam, silty clay, silty clay loam.	CL, ML, CH, MH	A-6, A-7	100	100	95-100	70-95	34-60	11-30
Summerton:										
SuA, SuB, SuC	0-7	Fine sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	100	95-100	75-95	25-60	<35	NP-7
	7-80	Sandy clay, clay loam, clay.	CL, ML	A-6, A-7, A-4	100	98-100	90-100	55-80	30-50	8-23
Tawcaw:										
TC:[1]										
Tawcaw part	0-7	Silt loam, silty clay loam, clay loam, silty clay.	CL, CH, ML, MH	A-4, A-6, A-7	100	100	85-100	75-95	28-50	8-24
	7-50	Silty clay loam, silty clay, clay, clay loam	CL, CH, ML, MH	A-6, A-7	100	100	90-100	51-98	30-60	11-30
	50-56	Silty clay loam, sandy clay loam, loam.	SC, SM-SC, CL-ML, CL	A-4, A-6, A-7	100	100	90-100	40-90	22-45	5-20
Chastain part	0-6	Clay, silty clay, silty clay loam, clay loam, loam.	ML, CL, MH, CH	A-6, A-7	100	100	90-100	75-98	35-75	12-40
	6-45	Silty clay loam, silty clay, clay, clay loam	CL, CH, ML, MH	A-6, A-7	100	100	95-100	85-98	35-75	12-40
	45-51	Clay loam, sandy clay loam, loam.	CL ML	A-6, A-7, A-4	100	100	90-100	51-90	22-45	5-20
Varina:										
VaA, VaB	0-12	Fine sandy loam	SM, SM-SC	A-2, A-4	95-100	92-100	75-94	15-49	<25	NP-7
	12-25	Sandy clay, clay loam, clay.	SC, CL, SM, ML	A-4, A-6, A-7	95-100	92-100	80-98	36-65	28-47	8-20
	25-80	Sandy clay, clay loam, clay.	SC, CL, ML, SM	A-4, A-6, A-7	95-100	92-100	80-95	36-65	28-47	8-20

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 7.--ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

[The symbol < means less than and > means more than. The erosion tolerance factor (T) is for the entire profile. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
Blanton:									
BaB	0-60	6.0-20	0.03-0.07	4.5-6.0	Very low	Low	High	0.17	5
	60-80	0.6-2.0	0.10-0.15	4.5-5.5	Low	High	High	0.32	
Borrow pits:									
Bp.									
Brogdon:									
BrA	0-17	6.0-20	0.04-0.08	5.1-6.5	Very low	Low	High	0.15	4
	17-35	2.0-6.0	0.10-0.14	4.5-5.5	Low	Low	High	0.17	
	35-58	2.0-6.0	0.06-0.11	4.5-5.5	Very low	Low	High	0.15	
	58-75	0.6-2.0	0.10-0.15	4.5-5.5	Low	Low	High	0.17	
Byars:									
By	0-9	0.6-2.0	0.11-0.16	3.6-5.5	Low	High	High	0.17	5
	9-73	0.06-0.2	0.14-0.18	3.6-5.5	Moderate	High	High	0.32	
Cahaba:									
CaA	0-12	2.0-6.0	0.05-0.14	4.5-6.5	Very low	Low	Moderate	0.24	4
	12-42	0.6-2.0	0.12-0.15	4.5-6.0	Low	Moderate	Moderate	0.20	
	42-72	6.0-20	0.05-0.10	4.5-6.0	Very low	Low	Moderate	0.24	
Cantey:									
Cn	0-7	0.6-2.0	0.14-0.18	3.6-5.5	Low	High	High	0.32	5
	7-75	0.06-0.2	0.11-0.16	3.6-5.5	Moderate	High	High	0.24	
Centenary:									
Ct	0-9	6.0-20	0.03-0.08	4.5-6.5	Very low	Moderate	Moderate	0.10	5
	9-36	6.0-20	0.05-0.08	4.5-6.0	Very low	Moderate	High	0.17	
	36-72	6.0-20	0.03-0.08	4.5-6.0	Very low	Moderate	High	0.10	
Coxville:									
Cx	0-7	0.6-2.0	0.12-0.17	4.5-6.0	Low	High	High	0.24	4
	7-72	0.2-0.6	0.14-0.18	4.5-5.5	Moderate	High	High	0.28	
Dothan:									
DaA, DaB	0-16	2.0-6.0	0.06-0.10	5.1-6.5	Very low	Moderate	Moderate	0.24	4
	16-40	0.6-2.0	0.10-0.14	4.5-5.5	Low	Moderate	Moderate	0.20	
	40-75	0.2-0.6	0.08-0.12	4.5-5.5	Low	Moderate	Moderate	0.10	
Dunbar:									
Dn	0-11	2.0-6.0	0.12-0.14	4.5-5.5	Low	High	High	0.32	3
	11-72	0.2-0.6	0.13-0.15	4.5-5.5	Moderate	High	High	0.28	
Duplin:									
DuA	0-7	2.0-6.0	0.10-0.15	4.5-6.0	Low	Moderate	High	0.32	3
	7-80	0.2-0.6	0.13-0.18	4.5-5.5	Moderate	High	High	0.28	
Eunola:									
EuA	0-9	2.0-6.0	0.06-0.11	4.5-6.0	Low	Low	High	0.28	4
	9-25	0.6-2.0	0.12-0.16	4.5-5.5	Low	Low	High	0.24	
	25-50	2.0-6.0	0.10-0.14	4.5-5.5	Low	Low	High	0.24	
	50-75	6.0-20	0.02-0.06	4.5-5.5	Low	Low	High	0.10	
Foreston:									
Fo	0-15	6.0-20	0.05-0.10	4.5-6.0	Very low	Moderate	High	0.10	4
	15-41	2.0-6.0	0.09-0.13	4.5-5.5	Low	Moderate	High	0.10	
	41-72	6.0-20	0.03-0.10	4.5-5.5	Very low	Moderate	High	0.10	
Fuquay:									
FuB, FuC	0-28	6.0-20	0.04-0.09	4.5-6.0	Very low	Low	High	0.20	5
	28-49	2.0-6.0	0.12-0.15	4.5-5.5	Low	Low	High	0.20	
	49-80	0.06-0.2	0.10-0.13	4.5-5.5	Low	Low	High	0.20	

TABLE 7.--ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
Goldsboro:									
GoA	0-12	2.0-6.0	0.09-0.12	4.5-6.0	Low	Moderate	High	0.17	5
	12-75	0.6-2.0	0.11-0.15	4.5-5.5	Low	Moderate	High	0.24	
Hiwassee:									
HwA	0-6	0.6-2.0	0.10-0.14	5.1-6.5	Low	Moderate	Moderate	0.32	5
	6-66	0.6-2.0	0.12-0.15	4.5-6.5	Moderate	Moderate	Moderate	0.28	
	66-80	2.0-6.0	0.10-0.14	4.5-6.5	Moderate	Moderate	Moderate	0.28	
Johnston:									
JN	0-35	2.0-6.0	0.11-0.15	4.5-5.5	Low	High	High	0.20	4
	35-70	6.0-20	0.02-0.10	4.5-5.5	Very low	High	High	0.17	
Kenansville:									
KnB	0-25	6.0-20	0.04-0.10	4.5-6.0	Very low	Low	High	0.15	5
	25-38	2.0-6.0	0.10-0.14	4.5-5.5	Low	Low	High	0.15	
	38-75	6.0-20	0.02-0.06	4.5-5.5	Very low	Low	High	0.10	
Lakeland:									
LaB	0-28	>20	0.05-0.08	4.5-6.0	Very low	Low	Moderate	0.17	5
	28-80	>20	0.03-0.08	4.5-6.0	Very low	Low	Moderate	0.10	
Leon:									
Le	0-22	6.0-20	0.02-0.05	3.6-5.5	Very low	High	High	0.15	4
	22-34	0.6-6.0	0.05-0.10	3.6-5.5	Very low	High	High	0.17	
	34-60	>20	0.02-0.05	3.6-5.5	Very low	High	High	0.10	
Lumbee:									
Lm	0-7	2.0-6.0	0.08-0.12	4.5-5.5	Low	High	High	0.17	3
	7-37	0.6-2.0	0.12-0.16	4.5-5.5	Low	High	High	0.17	
	37-72	6.0-20	0.03-0.06	4.5-5.5	Very low	High	High	0.15	
Lynchburg:									
Ln	0-9	2.0-6.0	0.09-0.13	4.5-6.5	Low	High	High	0.20	4
	9-72	0.6-2.0	0.12-0.16	4.5-5.5	Low	High	High	0.20	
Lynn Haven:									
Ly	0-14	6.0-20	0.02-0.05	3.6-5.5	Very low	High	High	0.17	4
	14-32	0.6-6.0	0.05-0.10	3.6-5.5	Very low	High	High	0.17	
	32-70	>20	0.01-0.05	3.6-5.5	Very low	High	High	0.10	
Osier:									
Os	0-5	6.0-20	0.05-0.08	4.5-6.0	Very low	High	High	0.15	4
	5-70	6.0-20	0.02-0.05	4.5-6.0	Very low	High	High	0.10	
Pantego:									
Pa	0-12	2.0-6.0	0.10-0.20	3.6-5.5	Low	High	High	0.10	5
	12-72	0.6-2.0	0.12-0.20	3.6-5.5	Low	High	High	0.15	
Paxville:									
Pb	0-18	2.0-6.0	0.12-0.16	3.6-5.5	Low	High	High	0.10	5
	18-42	0.6-2.0	0.12-0.18	3.6-5.5	Low	High	High	0.15	
	42-72	6.0-20	0.05-0.08	3.6-5.5	Low	High	High	0.10	
Persanti:									
PeA, PeB	0-8	0.6-2.0	0.11-0.15	4.5-6.0	Low	High	High	0.43	5
	8-75	0.06-0.2	0.12-0.15	4.5-5.5	Moderate	High	High	0.43	
Pocalla:									
PoA	0-23	>6.0	0.03-0.10	4.5-6.5	Very low	Low	High	0.15	5
	23-36	2.0-6.0	0.08-0.13	4.5-5.5	Low	Low	High	0.10	
	36-46	6.0-20	0.03-0.10	4.5-5.5	Very low	Low	High	0.10	
	46-72	0.6-2.0	0.10-0.15	4.5-5.5	Low	Low	High	0.15	
Ponzer:									
PZ	0-41	0.6-2.0	0.20-0.26	3.6-5.5	1/	High	High	0.15	3
	41-72	0.2-0.6	0.13-0.15	3.6-5.5	Low	High	High	0.28	

See footnotes at end of table.

TABLE 7.--ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES--Continued

Soil name and map symbol	Depth	Permea-bility	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete	Erosion factors: K	Erosion factors: T
	In	In/hr	In/in	pH					
Rains:									
Ra	0-8	2.0-6.0	0.08-0.12	4.5-6.0	Low	High	High	0.17	5
	8-50	0.6-2.0	0.10-0.15	4.5-5.5	Low	High	High	0.17	
	50-72	0.6-2.0	0.10-0.15	4.5-5.5	Low	High	High	0.20	
Rimini:									
RnB	0-40	>20	0.02-0.05	3.6-5.5	Very low	Low	Low	0.10	5
	40-61	0.6-2.0	0.03-0.07	3.6-5.5	Very low	Low	Low	0.17	
	61-80	>20	0.02-0.05	3.6-5.5	Very low	Low	Low	0.10	
Rutlege:									
Ru	0-12	2.0-6.0	0.06-0.10	3.6-5.5	Very low	High	High	0.17	4
	12-60	6.0-20	0.04-0.08	3.6-5.5	Very low	High	High	0.10	
Smithboro:									
Sm	0-6	0.6-2.0	0.15-0.20	4.5-5.5	Low	High	High	0.24	5
	6-75	0.06-0.2	0.14-0.18	3.6-5.5	Moderate	High	High	0.32	
Summerton:									
SuA, SuB, SuC	0-7	0.6-6.0	0.09-0.12	4.5-6.5	Low	High	High	0.28	5
	7-80	0.2-0.6	0.10-0.14	4.5-5.5	Low	High	High	0.28	
Tawcaw:									
TC:[2]									
Tawcaw part	0-7	0.06-0.2	0.12-0.18	4.5-6.5	Moderate	Moderate	High	0.32	5
	7-50	0.06-0.2	0.12-0.16	4.5-6.5	Moderate	High	High	0.37	
	50-56	0.2-0.6	0.11-0.16	4.5-6.5	Low	High	High	0.32	
Chastain part	0-6	0.06-0.2	0.12-0.16	4.5-5.5	Moderate	High	High	0.32	5
	6-45	0.06-0.2	0.12-0.16	4.5-5.5	Moderate	High	High	0.37	
	45-51	0.06-0.2	0.12-0.16	4.5-5.5	Moderate	High	High	0.37	
Varina:									
VaA, VaB	0-12	2.0-6.0	0.08-0.13	5.1-6.5	Low	Moderate	High	0.17	4
	12-25	0.6-2.0	0.12-0.18	4.5-5.5	Low	Moderate	High	0.28	
	25-80	0.06-0.2	0.06-0.09	4.5-5.5	Low	Moderate	High	0.28	

[1] High subsidence upon draining.
[2] This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 8.—SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the Glossary explain the terms "brief," "apparent," and "perched." The symbol < means less than; > means greater than. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months
					Ft		
Blanton: BaB	A	None	—	—	>6.0	—	—
Borrow pits: Bp.							
Brogdon: BrA	B	None	—	—	>6.0	—	—
Byars: By	D	Common	Long	Dec-Mar	0-1.0	Apparent	Nov-Apr
Cahaba: CaA	B	None	—	—	>6.0	—	—
Cantey: Cn	D	Frequent	Long	Nov-Apr	0-1.0	Apparent	Nov-Apr
Centenary: Ct	B	None	—	—	2.0-3.5	Apparent	Nov-Mar
Coxville: Cx	D	Rare	—	—	0-1.0	Apparent	Nov-Apr
Dothan: DaA, DaB	B	None	—	—	3.5-4.0	Perched	Jan-Apr
Dunbar: Dn	D	None	—	—	1.0-2.5	Apparent	Nov-May
Duplin: DuA	C	None	—	—	2.0-3.5	Apparent	Dec-Apr
Eunola: EuA	C	None	—	—	1.5-2.5	Apparent	Nov-Mar
Foreston: Fo	C	None	—	—	2.5-3.5	Apparent	Dec-Apr
Fuquay: FuB, FuC	B	None	—	—	3.5-4.0	Perched	Jan-Mar
Goldsboro: GoA	B	None	—	—	2.5-3.5	Apparent	Dec-Mar
Hiwassee: HwA	B	None	—	—	>6.0	—	—
Johnston: JN	B/D	Frequent	Very long	Nov-July	+1-1.0	Apparent	Nov-June
Kenansville: KnB	A	None	—	—	>6.0	—	—
Lakeland: LaB	A	None	—	—	>6.0	—	—
Leon: Le	A/D	None	—	—	0-1.0	Apparent	Nov-Apr
Lumbee: Lm	D	Rare	—	—	0-1.0	Apparent	Nov-Apr
Lynchburg: Ln	B/D	None	—	—	0.5-1.5	Apparent	Nov-Apr

TABLE 8.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
Lynn Haven:							
Ly	B/D	None	---	---	0-1.0	Apparent	Nov-Apr
Osier:							
Os	B/D	Common	Brief	Dec-Apr	0-1.0	Apparent	Nov-Apr
Pantego:							
Pa	D	Rare	---	---	0-1.0	Apparent	Nov-Apr
Paxville:							
Pb	D	Rare	---	---	0-1.0	Apparent	Nov-Apr
Persanti:							
PeA, PeB	C	None	---	---	2.0-3.5	Apparent	Dec-Apr
Pocalla:							
PoA	A	None	---	---	>6.0	---	---
Ponzer:							
PZ	D	Frequent	Very long	Nov-Jun	+1-1.0	Apparent	Nov-July
Rains:							
Ra	B/D	Rare	---	---	0-1.0	Apparent	Nov-Apr
Rimini:							
RnB	A	None	---	---	>6.0	---	---
Rutlege:							
Ru	B/D	Common	Brief	Dec-May	0-1.0	Apparent	Dec-May
Smithboro:							
Sm	D	None	---	---	0-1.0	Apparent	Dec-Mar
Summerton:							
SuA, SuB, SuC	B	None	---	---	>6.0	---	---
Tawcaw:							
TC:[1]							
Tawcaw part	C	Frequent	Long	Dec-Apr	1.5-2.5	Apparent	Nov-Apr
Chastain part	D	Frequent	Very long	Dec-Apr	0-1.0	Apparent	Nov-May
Varina:							
VaA, VaB	C	None	---	---	2.5-5.0	Perched	Dec-Apr

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 9.—BUILDING SITE DEVELOPMENT

["Shrink-swell," and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe". Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Blanton:				
BaB	Severe: cutbanks cave.	Slight	Slight	Slight.
Borrow pits:				
Bp.				
Brogdon:				
BrA	Slight	Slight	Slight	Slight.
Byars:				
By	Severe: wetness, floods, too clayey.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.
Cahaba:				
CaA	Slight	Slight	Slight	Slight.
Cantey:				
Cn	Severe: wetness, floods, too clayey.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.	Severe: wetness, floods, low strength.
Centenary:				
Ct	Severe: cutbanks cave.	Moderate: wetness.	Moderate: wetness.	Slight.
Coxville:				
Cx	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, low strength.
Dothan:				
DaA	Moderate: wetness.	Slight	Slight	Slight.
DaB	Moderate: wetness.	Slight	Moderate: slope.	Slight.
Dunbar:				
Dn	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, low strength.
Duplin:				
DuA	Moderate: too clayey, wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.
Eunola:				
EuA	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Slight.
Foreston:				
Fo	Moderate: wetness, cutbanks cave.	Slight	Moderate: wetness.	Slight.
Fuquay:				
FuB	Slight	Slight	Slight	Slight.
FuC	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Goldsboro:				
GoA	Moderate: wetness.	Slight	Moderate: wetness.	Slight.
Hiwassee:				
HwA	Severe: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: low strength.
Johnston:				
JN	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Kenansville:				
KnB	Severe: cutbanks cave.	Slight	Slight	Slight.
Lakeland:				
LaB	Severe: cutbanks cave.	Slight	Slight	Slight.
Leon:				
Le	Severe: cutbacks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Lumbee:				
Lm	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
Lynchburg:				
Ln	Severe: wetness.	Severe: wetness.	Severe: wetness,	Moderate: wetness.
Lynn Haven:				
Ly	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Osier:				
Os	Severe: wetness, floods, cutbanks cave.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Pantego:				
Pa	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
Paxville:				
Pb	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
Persanti:				
PeA, PeB	Severe: wetness, too clayey.	Moderate: wetness, shrink-swell, low strength.	Moderate: wetness, shrink-swell, low strength.	Severe: low strength.
Pocalla:				
PoA	Slight	Slight	Slight	Slight.
Ponzer:				
PZ	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Rains:				
Ra	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness.
Rimini:				
RnB	Severe: cutbanks cave.	Slight	Slight	Slight.
Rutlege:				
Ru	Severe: floods, wetness, cutbanks cave.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Smithboro:				
Sm	Severe: wetness, too clayey.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.
Summerton:				
SuA	Moderate: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.
SuB	Moderate: too clayey.	Moderate: low strength.	Moderate: slope, low strength.	Moderate: low strength.
SuC	Moderate: too clayey, slope.	Moderate: low strength.	Severe: slope.	Moderate: low strength, slope.
Tawcaw:				
TC:[1]				
Tawcaw part	Severe: floods, wetness, too clayey.	Severe: floods, low strength.	Severe: floods, wetness.	Severe: floods, low strength.
Chastain part	Severe: floods, wetness, too clayey.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.	Severe: floods, wetness, low strength.
Varina:				
VaA	Slight	Slight	Slight	Slight.
VaB	Slight	Slight	Moderate: slope.	Slight.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 10.--SANITARY FACILITIES

["Percs slowly" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Blanton:					
BaB	Slight	Severe: seepage.	Severe: too sandy.	Slight	Poor: too sandy, seepage.
Borrow pits:					
Bp.					
Brogdon:					
BrA	Slight	Severe: seepage.	Moderate: seepage.	Moderate: seepage.	Good.
Byars:					
By	Severe: wetness, floods.	Slight	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
Cahaba:					
CaA	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
Cantey:					
Cn	Severe: wetness, floods, percs slowly.	Slight	Severe: wetness, floods, too clayey.	Severe: wetness, floods.	Poor: wetness, too clayey.
Centenary:					
Ct	Severe: wetness, seepage.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: wetness, seepage.	Poor: too sandy, seepage.
Coxville:					
Cx	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Dothan:					
DaA	Moderate: percs slowly.	Slight	Slight	Slight	Good.
DaB	Moderate: percs slowly.	Moderate: slope.	Slight	Slight	Good.
Dunbar:					
Dn	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Duplin:					
DuA	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Eunola:					
EuA	Severe: wetness.	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Good.
Foreston:					
Fo	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage.	Severe: wetness, seepage.	Good.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Fuquay:					
FuB	Moderate: percs slowly.	Moderate: slope, seepage.	Slight	Slight	Good.
FuC	Moderate: percs slowly, slope.	Severe: slope.	Slight	Moderate: slope.	Good.
Goldsboro:					
GoA	Severe: wetness.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Good.
Hiwassee:					
HwA	Moderate: percs slowly.	Moderate: seepage.	Severe: too clayey.	Slight	Poor: too clayey.
Johnston:					
JN	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness.
Kenansville:					
KnB	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Fair: too sandy.
Lakeland:					
LaB	Slight [1]	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy, seepage.
Leon:					
Le	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy, wetness.
Lumbee:					
Lm	Severe; wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Lynchburg:					
Ln	Severe: wetness.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Good.
Lynn Haven:					
Ly	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
Osier:					
Os	Severe: wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Severe: wetness, floods, seepage.	Poor: wetness.
Pantego:					
Pa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Paxville:					
Pb	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Persanti:					
PeA, PeB	Severe: wetness, percs slowly.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.

See footnotes at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Pocalla:					
PoA	Slight	Severe: seepage.	Moderate: seepage.	Moderate: seepage.	Good.
Ponzer:					
PZ	Severe: wetness, floods.	Severe: wetness, floods, excess humus.	Severe: wetness, floods, excess humus.	Severe: wetness, floods.	Severe: wetness, excess humus.
Rains:					
Ra	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Rimini:					
RnB	Slight[1]	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
Rutlege:					
Ru	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Severe: floods, wetness, seepage.	Poor: wetness.
Smithboro:					
Sm	Severe: wetness, percs slowly.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness, too clayey.
Summerton:					
SuA	Severe: percs slowly.	Slight	Severe: too clayey.	Slight	Fair: too clayey.
SuB	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Fair: too clayey.
SuC	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: too clayey.
Tawcaw:					
TC:[2]					
Tawcaw part	Severe: floods, wetness, percs slowly.	Severe: floods.	Severe: floods, wetness, too clayey.	Severe: floods, wetness.	Poor: too clayey.
Chastain part	Severe: floods, wetness, percs slowly.	Severe: floods.	Severe: floods, wetness, too clayey.	Severe: floods, wetness.	Poor: too clayey, wetness.
Varina:					
VaA	Moderate: percs slowly.	Slight	Moderate: too clayey.	Slight	Good.
VaB	Moderate: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Good.

[1]Excessive permeability rate may cause pollution of ground water.
[2]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 11.—CONSTRUCTION MATERIALS

["Shrink-swell" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Topsoil
Blanton: BaB	Good	Fair: excess fines.	Poor: too sandy.
Borrow pits: Bp.			
Brogdon: BrA	Good	Poor: excess fines.	Poor: too sandy.
Byars: By	Poor: wetness, low strength.	Unsuited	Poor: wetness.
Cahaba: CaA	Good	Poor: excess fines.	Fair: thin layer.
Cantey: Cn	Poor: wetness, low strength.	Unsuited	Poor: wetness, thin layer.
Centenary: Ct	Good	Fair: excess fines.	Poor: too sandy.
Coxville: Cx	Poor: wetness, low strength.	Unsuited	Poor: wetness.
Dothan: DaA, DaB	Good	Poor: excess fines.	Fair: too sandy.
Dunbar: Dn	Poor: low strength, wetness.	Unsuited	Fair: thin layer.
Duplin: DuA	Poor: low strength.	Unsuited	Fair: thin layer.
Eunola: EuA	Fair: low strength.	Poor: excess fines.	Poor: too sandy.
Foreston: Fo	Good	Poor: excess fines.	Poor: too sandy.
Fuquay: FuB, FuC	Good	Poor: excess fines.	Poor: too sandy.
Goldsboro: GoA	Good	Unsuited	Good.
Hiwassee: HwA	Poor: low strength.	Unsuited	Poor: thin layer.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Topsoil
Johnston: JN	Poor: wetness.	Unsuited	Poor: wetness.
Kenansville: KnB	Good	Fair: excess fines.	Poor: too sandy.
Lakeland: LaB	Good	Good	Poor: too sandy.
Leon: Le	Poor: wetness.	Fair: excess fines.	Poor: too sandy, wetness.
Lumbee: Lm	Poor: wetness.	Poor: excess fines.	Poor: wetness.
Lynchburg: Ln	Fair: wetness.	Unsuited	Good.
Lynn Haven: Ly	Poor: wetness.	Fair: excess fines.	Poor: too sandy, wetness.
Osier: Os	Poor: wetness.	Fair: excess fines.	Poor: wetness, too sandy.
Pantego: Pa	Poor: wetness.	Unsuited	Poor: wetness.
Paxville: Pb	Poor: wetness.	Unsuited	Poor: wetness.
Persanti: PeA, PeB	Poor: low strength.	Unsuited	Poor: thin layer.
Pocalla: PoA	Good	Poor: excess fines.	Poor: too sandy.
Ponzer: PZ	Poor: excess humus, wetness.	Unsuited	Poor: wetness.
Rains: Ra	Poor: wetness.	Unsuited	Poor: wetness.
Rimini: RnB	Good	Good	Poor: too sandy.
Rutlege: Ru	Poor: wetness.	Fair: excess fines.	Poor: wetness, too sandy.

TABLE 11.—CONSTRUCTION MATERIALS—Continued

Soil name and map symbol	Roadfill	Sand	Topsoil
Smithboro:			
Sm	Poor: low strength.	Unsuited	Poor: too clayey.
Summerton:			
SuA, SuB	Fair: low strength.	Unsuited	Fair: thin layer.
SuC	Fair: low strength.	Unsuited	Fair: thin layer, slope.
Tawcaw:			
TC:[1]			
Tawcaw part	Poor: low strength.	Unsuited	Poor: too clayey.
Chastain part	Poor: wetness, low strength.	Unsuited	Poor: wetness, too clayey.
Varina:			
VaA, VaB	Fair: low strength.	Unsuited	Fair: thin layer.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 12.--WATER MANAGEMENT

["Seepage," "piping," and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not evaluated]

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation
Blanton: BaB	Severe: seepage.	Severe: piping, seepage.	Severe: no water.	Not needed	Droughty, seepage, fast intake.
Borrow pits: Bp.					
Brogdon: BrA	Moderate: seepage.	Moderate: seepage, piping.	Severe: deep to water.	Not needed	Fast intake, seepage.
Byars: By	Slight	Moderate: compressible, shrink-swell.	Slight	Wetness, percs slowly, poor outlets, floods.	Wetness, percs slowly, floods.
Cahaba: CaA	Severe: seepage.	Moderate: piping, erodes easily.	Severe: deep to water.	Not needed	Favorable.
Cantey: Cn	Slight	Moderate: compressible.	Slight	Wetness, floods, percs slowly.	Wetness, floods, percs slowly.
Centenary: Ct	Severe: seepage.	Severe: seepage, piping, unstable fill.	Severe: deep to water.	Cutbanks cave	Seepage, fast intake.
Coxville: Cx	Slight	Moderate: compressible.	Slight	Wetness, percs slowly.	Wetness, percs slowly.
Dothan: DaA, DaB	Slight	Slight	Severe: no water.	Not needed	Favorable.
Dunbar: Dn	Slight	Moderate: compressible.	Moderate: deep to water.	Wetness, percs slowly.	Wetness, percs slowly.
Duplin: DuA	Slight	Moderate: compressible.	Moderate: deep to water, slow refill.	Percs slowly	Wetness, percs slowly.
Eunola: EuA	Moderate: seepage.	Moderate: low strength, piping.	Moderate: deep to water.	Favorable	Favorable.
Foreston: Fo	Severe: seepage.	Moderate: seepage, piping.	Moderate: deep to water.	Cutbanks cave, wetness.	Fast intake, seepage.
Fuquay: FuB, FuC	Slight	Moderate: piping.	Severe: deep to water.	Not needed	Fast intake, seepage, slope.

TABLE 12.—WATER MANAGEMENT—Continued

Soil name and map symbol	Limitations for— Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting— Drainage	Irrigation
Goldsboro: GoA	Moderate: seepage.	Slight	Moderate: deep to water.	Favorable	Favorable.
Hiwassee: HwA	Moderate: seepage.	Moderate: compressible.	Severe: deep to water.	Not needed	Favorable.
Johnston: JN	Severe: seepage.	Severe: piping, seepage.	Slight	Wetness, floods.	Wetness, floods.
Kenansville: KnB	Severe: seepage.	Moderate: seepage, piping.	Severe: deep to water.	Not needed	Fast intake, seepage.
Lakeland: LaB	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Not needed	Droughty, seepage, fast intake.
Leon: Le	Severe: seepage.	Severe: seepage, piping, erodes easily.	Moderate: deep to water.	Cutbanks cave, wetness.	Wetness.
Lumbee: Lm	Moderate: seepage.	Moderate: seepage, piping.	Slight	Wetness	Wetness.
Lynchburg: Ln	Moderate: seepage.	Moderate: piping.	Moderate: deep to water.	Favorable	Wetness.
Lynn Haven: Ly	Severe: seepage.	Severe: seepage, piping, erodes easily.	Slight	Cutbanks cave, wetness.	Wetness.
Osier: Os	Severe: seepage.	Severe: piping, seepage.	Moderate: deep to water.	Cutbanks cave, wetness, floods.	Wetness, floods.
Pantego: Pa	Moderate: seepage.	Slight	Slight	Poor outlets, wetness.	Wetness.
Paxville: Pb	Moderate: seepage.	Moderate: piping.	Slight	Wetness	Wetness.
Persanti: PeA	Slight	Moderate: low strength, piping.	Moderate: deep to water.	Wetness, percs slowly.	Wetness, percs slowly.
PeB	Slight	Moderate: low strength, piping.	Moderate: deep to water.	Wetness, percs slowly.	Wetness, percs slowly, slope.
Pocalla: PoA	Moderate: seepage.	Moderate: seepage, piping.	Severe: deep to water.	Not needed	Fast intake, seepage.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Features affecting-- Drainage	Irrigation
Ponzer:					
PZ	Moderate: excess humus, seepage.	Severe: excess humus.	Slight	Wetness, floods, excess humus.	Wetness, floods.
Rains:					
Ra	Moderate: seepage.	Slight	Slight	Wetness	Wetness.
Rimini:					
RnB	Severe: seepage.	Severe: seepage, unstable fill.	Severe: no water.	Not needed	Droughty, seepage.
Rutlege:					
Ru	Severe: seepage.	Severe: piping, seepage.	Slight	Cutbanks cave, wetness, floods.	Wetness, floods.
Smithboro:					
Sm	Slight	Moderate: compressible.	Slight	Percs slowly, wetess.	Slow intake, wetness, percs slowly.
Summerton:					
SuA	Slight	Moderate: low strength, piping.	Severe: deep to water.	Not needed	Percs slowly.
SuB, SuC	Slight	Moderate: low strength, piping.	Severe: deep to water.	Not needed	Slope, percs slowly.
Tawcaw:					
TC:[1]					
Tawcaw part	Slight	Moderate: compressible, low strength.	Moderate: deep to water.	Floods, wetness, percs slowly.	Floods, wetness, percs slowly.
Chastain part	Slight	Moderate: compressible, low strength.	Slight	Floods, wetness, percs slowly.	Floods, wetness, percs slowly.
Varina:					
VaA	Slight	Slight	Severe: deep to water.	Not needed	Favorable.
VaB	Slight	Slight	Severe: deep to water.	Not needed	Slope.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 13.--RECREATIONAL DEVELOPMENT

["Percs slowly," and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe". Absence of an entry means soil was not evaluated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Blanton:				
BaB	Moderate: too sandy.	Moderate: too sandy.	Severe: too sandy.	Severe: too sandy.
Borrow pits: Bp.				
Brogdon:				
BrA	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.
Byars:				
By	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Cahaba:				
CaA	Slight	Slight	Slight	Slight.
Cantey:				
Cn	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Centenary:				
Ct	Moderate: too sandy.	Moderate: too sandy.	Severe: too sandy.	Severe: too sandy.
Coxville:				
Cx	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Dothan:				
DaA	Slight	Slight	Slight	Slight.
DaB	Slight	Slight	Moderate: slope.	Slight.
Dunbar:				
Dn	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
Duplin:				
DuA	Moderate: percs slowly.	Slight	Moderate: wetness, percs slowly.	Slight.
Eunola:				
EuA	Moderate: wetness.	Slight	Moderate: wetness.	Slight.
Foreston:				
Fo	Moderate: too sandy, wetness.	Moderate: too sandy.	Moderate: too sandy, wetness.	Moderate: too sandy.
Fuquay:				
FuB	Moderate: too sandy.	Moderate: too sandy.	Severe: too sandy.	Moderate: too sandy.
FuC	Moderate: too sandy, slope.	Moderate: too sandy, slope.	Severe: too sandy, slope.	Moderate: too sandy.
Goldsboro:				
GoA	Slight	Slight	Slight	Slight.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Hiwassee:				
HwA	Slight	Slight	Slight	Slight.
Johnston:				
JN	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Kenansville:				
KnB	Moderate: too sandy.	Moderate: too sandy.	Severe: too sandy.	Moderate: too sandy.
Lakeland:				
LaB	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.
Leon:				
Le	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Lumbee:				
Lm	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Lynchburg:				
Ln	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
Lynn Haven:				
Ly	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Osier:				
Os	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Pantego:				
Pa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Paxville:				
Pb	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Persanti:				
PeA	Moderate: percs slowly, wetness.	Slight	Moderate: percs slowly, wetness.	Slight.
PeB	Moderate: percs slowly, wetness.	Slight	Moderate: percs slowly, slope.	Slight.
Pocalla:				
PoA	Moderate: too sandy.	Moderate: too sandy.	Severe: too sandy.	Moderate: too sandy.
Ponzer:				
PZ	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
Rains:				
Ra	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Rimini:				
RnB	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.

TABLE 13.—RECREATIONAL DEVELOPMENT—Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Rutlege:				
Ru	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Smithboro:				
Sm	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.
Summerton:				
SuA	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight.
SuB	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
SuC	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight.
Tawcaw:				
TC:[1]				
Tawcaw part	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.
Chastain part	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.
Varina:				
VaA	Slight	Slight	Slight	Slight.
VaB	Slight	Slight	Moderate: slope.	Slight.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior of the whole mapping unit.

TABLE 14.—CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Blanton	Loamy, siliceous, thermic Grossarenic Paleudults
Brogdon	Coarse-loamy, siliceous, thermic Plinthic Paleudults
Byars	Clayey, kaolinitic, thermic Umbric Paleaquults
Cahaba	Fine-loamy, siliceous, thermic Typic Hapludults
Cantey	Clayey, kaolinitic, thermic Typic Albaquults
Centenary	Sandy, siliceous, thermic Grossarenic Entic Haplohumods
Chastain	Fine, kaolinitic, acid, thermic Typic Haplaquepts
Coxville	Clayey, kaolinitic, thermic Typic Paleaquults
Dothan	Fine-loamy, siliceous, thermic Plinthic Paleudults
Dunbar	Clayey, kaolinitic, thermic Aeric Paleaquults
Duplin	Clayey, kaolinitic, thermic Aquic Paleudults
Eunola	Fine-loamy, siliceous, thermic Aquic Hapludults
Foreston	Coarse-loamy, siliceous, thermic Aquic Paleudults
Fuquay	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Goldsboro	Fine-loamy, siliceous, thermic Aquic Paleudults
Hiwassee	Clayey, kaolinitic, thermic Typic Rhodudults
Johnston	Coarse-loamy, siliceous, acid, thermic Cumulic Humaquepts
Kenansville	Loamy, siliceous, thermic, Arenic Hapludults
Lakeland	Thermic, coated Typic Quartzipsamments
Leon	Sandy, siliceous, thermic Aeric Haplaquods
Lumbee	Fine-loamy over sandy or sandy-skeletal, siliceous, thermic Typic Ochraquults
Lynchburg	Fine-loamy, siliceous, thermic Aeric Paleaquults
Lynn Haven	Sandy, siliceous, thermic Typic Haplaquods
Osier	Siliceous, thermic Typic Psammaquents
Pantego	Fine-loamy, siliceous, thermic Umbric Paleaquults
*Paxville	Fine-loamy, siliceous, thermic Umbric Paleaquults
*Persanti	Clayey, kaolinitic, thermic Aquic Paleudults
Pocalla	Loamy, siliceous, thermic Arenic Plinthic Paleudults
Ponzer	Loamy, mixed, dysic, thermic Terric Medisaprists
Rains	Fine-loamy, siliceous, thermic Typic Paleaquults
*Rimini	Sandy, siliceous, thermic Grossarenic Enthic Haplohumods
Rutlege	Sandy, siliceous, thermic, Typic Humaquepts
Smithboro	Clayey, kaolinitic, thermic Aeric Paleaquults
Summerton	Clayey, kaolinitic, thermic Typic Paleudults
Tawcaw	Fine, kaolinitic, thermic Fluvaquentic Dystrochrepts
Varina	Clayey, kaolinitic thermic Plinthic Paleudults

TABLE 15.—TEMPERATURE AND PRECIPITATION DATA[1]

[Recorded in the period 1949-73 at Marion, South Carolina]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have— Maximum temperature higher than	2 years in 10 will have— Minimum temperature lower than	Average number of growing degree days[1]	Average	2 years in 10 will have— Less than	2 years in 10 will have— More than	Average number of days with 0.10 inch or more	Average snowfall
	F	F	F	F	F		In	In	In		In
January	58.2	35.1	46.7	78.7	12.6	80.0	2.8	1.3	4.3	5.1	0.2
February	60.7	36.3	48.5	80.7	15.9	88.3	3.9	2.2	5.5	6.2	0.8
March	67.2	41.8	54.5	85.9	22.6	193.7	4.4	2.6	6.2	7.0	0.2
April	76.4	49.7	63.1	91.1	30.2	388.6	3.1	1.6	4.6	5.4	0.0
May	83.7	58.3	71.0	96.3	39.3	640.7	3.5	2.1	4.9	6.4	0.0
June	89.0	65.4	77.2	101.5	50.8	795.6	4.8	2.2	7.3	6.9	0.0
July	91.1	68.9	80.0	100.4	57.1	900.5	6.2	3.2	9.1	9.6	0.0
August	90.2	67.9	79.0	99.9	55.1	863.9	5.5	3.1	7.9	7.9	0.0
September	85.1	62.1	73.6	96.1	44.5	686.3	4.0	1.7	6.3	5.2	0.0
October	76.7	50.9	63.8	91.3	28.1	422.5	3.5	0.3	6.6	4.1	0.0
November	67.2	40.6	53.9	83.8	18.8	169.8	2.7	1.2	4.2	4.3	0.0
December	59.4	35.4	47.4	78.4	14.5	96.1	2.5	1.3	3.7	5.0	0.0
Year	75.6	51.2	63.3	100.3[2]	14.0[3]	5,396.	45.3	37.6	53.0	73.9	1.2

[1]A growing degree day is an index of the amount of heat available for plant growth. Growing degree days accumulate each day in the amount by which the average daily temperature exceeds the temperature below which growth is minimal for the principal crops in the area (50 F).

[2]Average annual highest temperature.

[3]Average annual lowest temperature.

TABLE 16.—PROBABILITIES OF LAST FREEZING TEMPERATURES IN SPRING AND FIRST IN FALL

[Recorded in the period 1949-73 at Marion, South Carolina]

Probability	Dates for given probability and temperature— 24 degrees F or lower	28 degrees F or lower	32 degrees F or lower
SPRING:			
1 year in 10 later than	March 23	April 14	April 24
2 years in 10 later than	March 13	April 7	April 20
5 years in 10 later than	March 6	March 26	April 14
FALL:			
1 year in 10 earlier than	November 1	October 26	October 19
2 years in 10 earlier than	November 7	October 28	October 21
5 years in 10 earlier than	November 13	November 4	October 26

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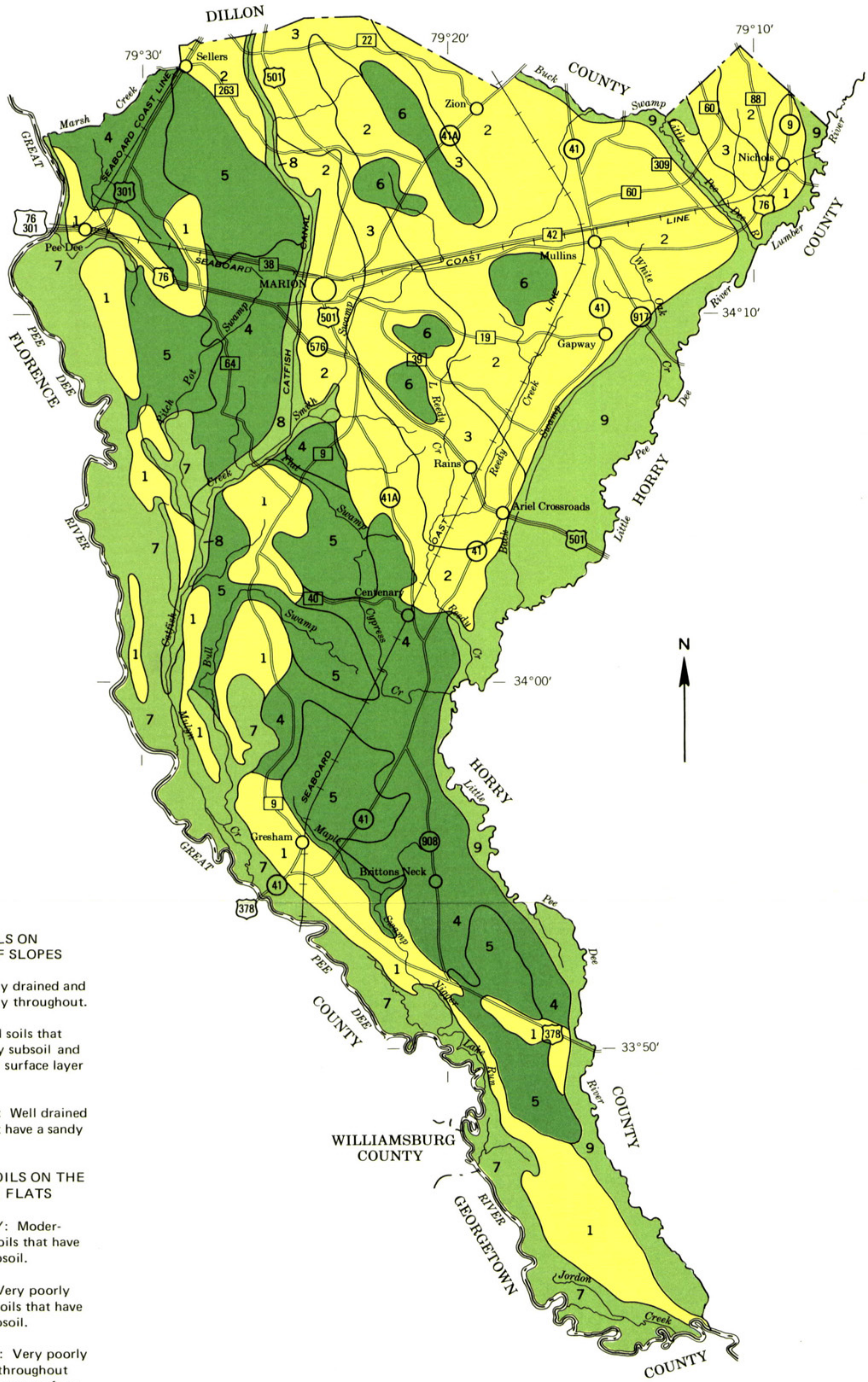


SOIL ASSOCIATIONS

NEARLY LEVEL TO SLOPING SOILS ON RIDGES AND THE UPPER PART OF SLOPES

1 LAKELAND–RUTLEGE: Excessively drained and very poorly drained soils that are sandy throughout.

2 DOTHAN–COXVILLE: Well drained soils that have a sandy surface layer and a loamy subsoil and poorly drained soils that have a loamy surface layer and a clayey subsoil.

3 FUQUAY–BLANTON–FORESTON: Well drained and moderately well drained soils that have a sandy surface layer and a loamy subsoil.

DOMINANTLY NEARLY LEVEL SOILS ON THE LOWER PART OF SLOPES AND ON FLATS

4 SMITHBORO–PERSANTI–CANTEY: Moderately well drained to poorly drained soils that have a loamy surface layer and a clayey subsoil.

5 CANTEY–BYARS–SMITHBORO: Very poorly drained to somewhat poorly drained soils that have a loamy surface layer and a clayey subsoil.

6 PANTEGO–RUTLEGE–COXVILLE: Very poorly drained soils that are loamy or sandy throughout and poorly drained soils that have a loamy surface layer and a clayey subsoil.

NEARLY LEVEL SOILS ON FLOOD PLAINS

7 TAWCAW–CHASTAIN: Somewhat poorly drained and poorly drained soils that have a clayey or loamy surface layer and a clayey subsoil.

8 PONZER: Very poorly drained soils that have a mucky surface layer and a loamy underlying layer.

9 JOHNSTON–RUTLEGE–LAKELAND: Very poorly drained soils that are dominantly loamy or sandy throughout and excessively drained soils that are sandy throughout.

Compiled 1978

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION
AND SOUTH CAROLINA LAND
RESOURCES CONSERVATION COMMISSION

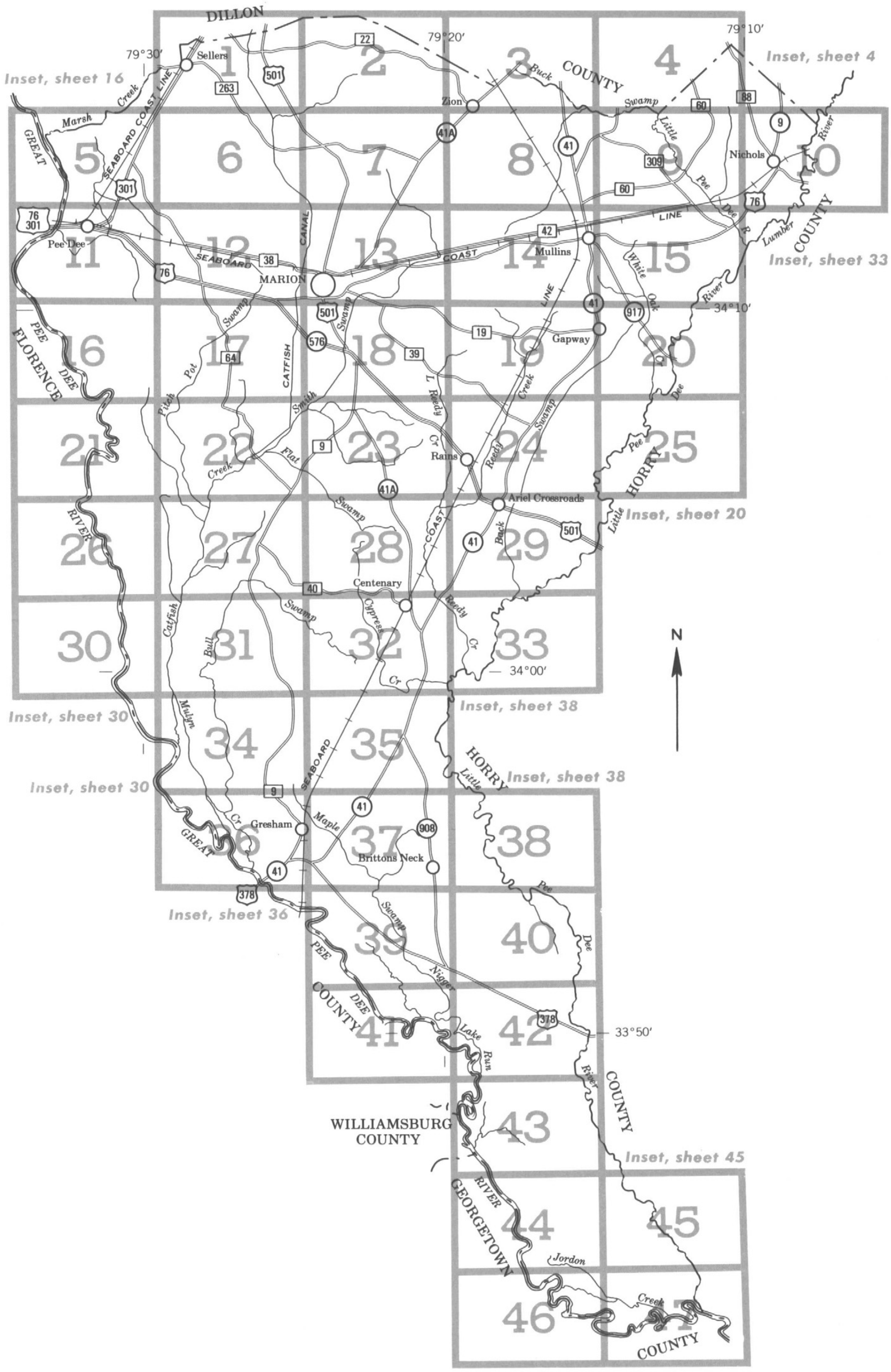
GENERAL SOIL MAP

MARION COUNTY, SOUTH CAROLINA

Scale 1:253,440

1 0 1 2 3 4 Miles

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



INDEX TO MAP SHEETS

MARION COUNTY, SOUTH CAROLINA

Scale 1:253,440

1 0 1 2 3 4 Miles

SOIL LEGEND

The first capital letter is the initial one of the soil name. The second letter is lower case for a narrowly defined unit and a capital for a broadly defined unit. 1/ Consecutive capital letters in the first and second position in the map symbols indicate that the composition of the unit is apt to be more variable than other units in the soil survey area. The third letter, if used, is a capital letter and connotes slope class. Symbols without a slope letter are for level soils.

SYMBOL	NAME
BaB	Blanton sand, 0 to 6 percent slopes
Bp	Borrow pits
BrA	Brogdon sand, 0 to 2 percent slopes
By	Byars loam
CaA	Cahaba loamy sand, 0 to 2 percent slopes
Cn	Cantey loam
Ct	Centenary sand
Cx	Coxville fine sandy loam
DaA	Dothan loamy fine sand, 0 to 2 percent slopes
DaB	Dothan loamy fine sand, 2 to 6 percent slopes
Dn	Dunbar loamy sand
DuA	Duplin fine sandy loam, 0 to 2 percent slopes
EuA	Eunola loamy sand, 0 to 2 percent slopes
Fo	Foreston loamy sand
FuB	Fuquay sand, 0 to 6 percent slopes
FuC	Fuquay sand, 6 to 10 percent slopes
GoA	Goldsboro loamy fine sand, 0 to 2 percent slopes
HwA	Hiwassee fine sandy loam, 0 to 2 percent slopes
JN	Johnston association, frequently flooded
KnB	Kenansville sand, 0 to 4 percent slopes
LaB	Lakeland sand, 0 to 6 percent slopes
Le	Leon sand
Lm	Lumbee sandy loam
Ln	Lynchburg sandy loam
Ly	Lynn Haven sand
Os	Osier loamy sand
Pa	Pantego loam
Pb	Paxville loam
PeA	Persanti fine sandy loam, 0 to 2 percent slopes
PeB	Persanti fine sandy loam, 2 to 6 percent slopes
PoA	Pocalla sand, 0 to 2 percent slopes
PZ	Ponzer soils
Ra	Rains sandy loam
RnB	Rimini sand, 0 to 6 percent slopes
Ru	Rutlege loamy sand
Sm	Smithboro silt loam
SuA	Summerton fine sandy loam, 0 to 2 percent slopes
SuB	Summerton fine sandy loam, 2 to 6 percent slopes
SuC	Summerton fine sandy loam, 6 to 10 percent slopes
TC	Tawcaw-Chastain association, frequently flooded
VaA	Varina fine sandy loam, 0 to 2 percent slopes
VaB	Varina fine sandy loam, 2 to 6 percent slopes

1/ Delineations of the broadly defined units generally are larger and the composition of the units is apt to be more variable than for others in the survey area. Mapping has been controlled well enough, however, for the anticipated uses of the soils.

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool — Davis Airstrip; FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate — 79
- Federal — 410
- State — 52
- County, farm or ranch — 378

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water; w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — GAS
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water; w
- Intermittent — int; i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — CeA FoB2

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) — S

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Dug pond
- Borrow Pit

1

MARION COUNTY, SOUTH CAROLINA NO. 1
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

10

N

1 Mile
5000 Feet
0 0
1000
¼
2000
½
3000
¾
4000
5000
1 5000
Scale 1:20000

SuB (Joins inset, sheet 4)

2 575 000 FEET

460 000 FEET

(Joins sheet 9)

450 000 FEET

2 555 000 FEET (Joins inset, sheet 33)

HORRY COUNTY

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MARION COUNTY, SOUTH CAROLINA NO. 10

(11)

N

Scale 1:20 000

1 Mile

5000 Feet

MARION COUNTY, SOUTH CAROLINA NO. 11

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This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

13

N

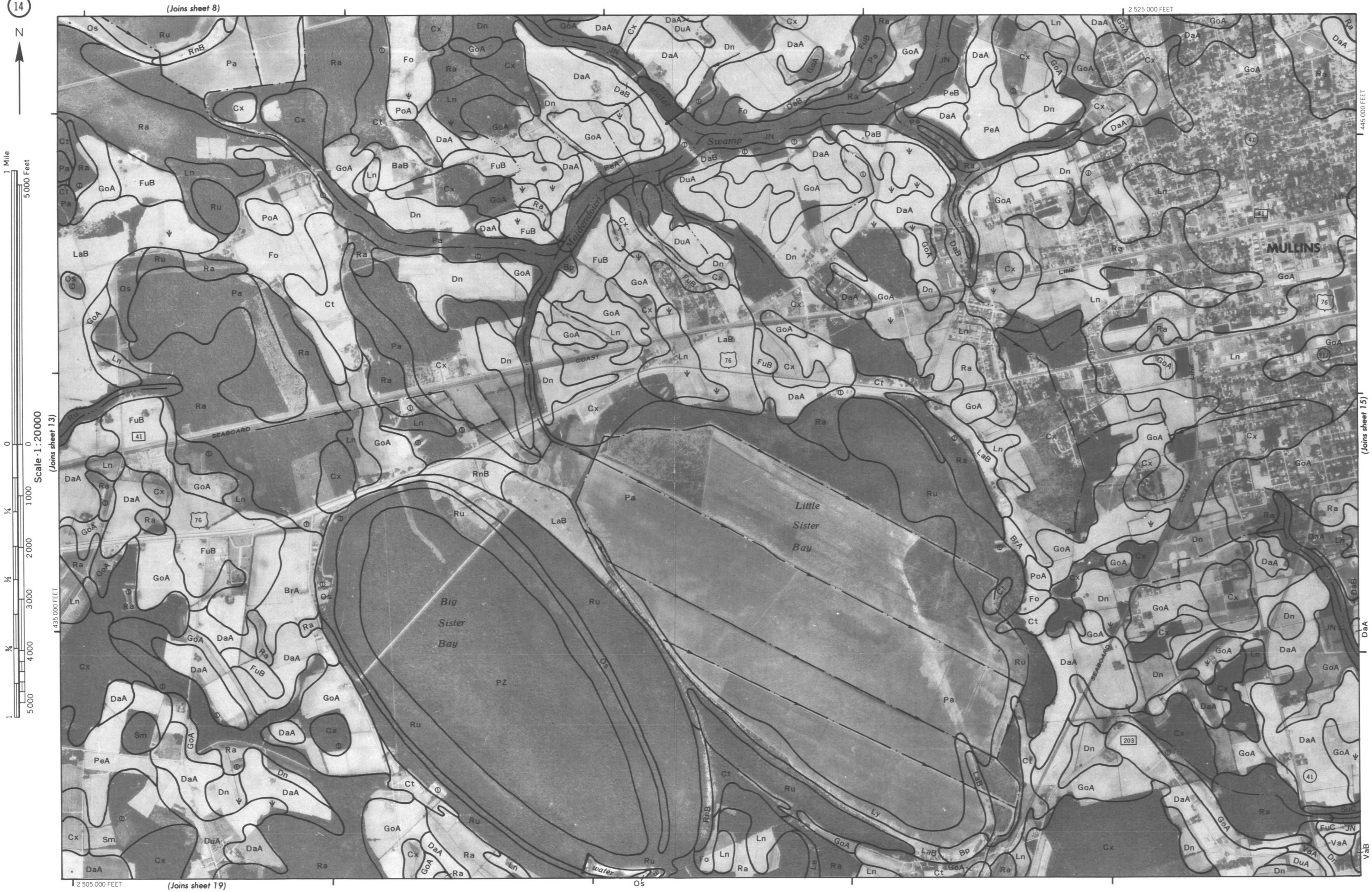
Scale 1:20000

1 Mile

5000 Feet

MARION COUNTY, SOUTH CAROLINA NO. 13

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

15

MARION COUNTY, SOUTH CAROLINA NO. 15

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

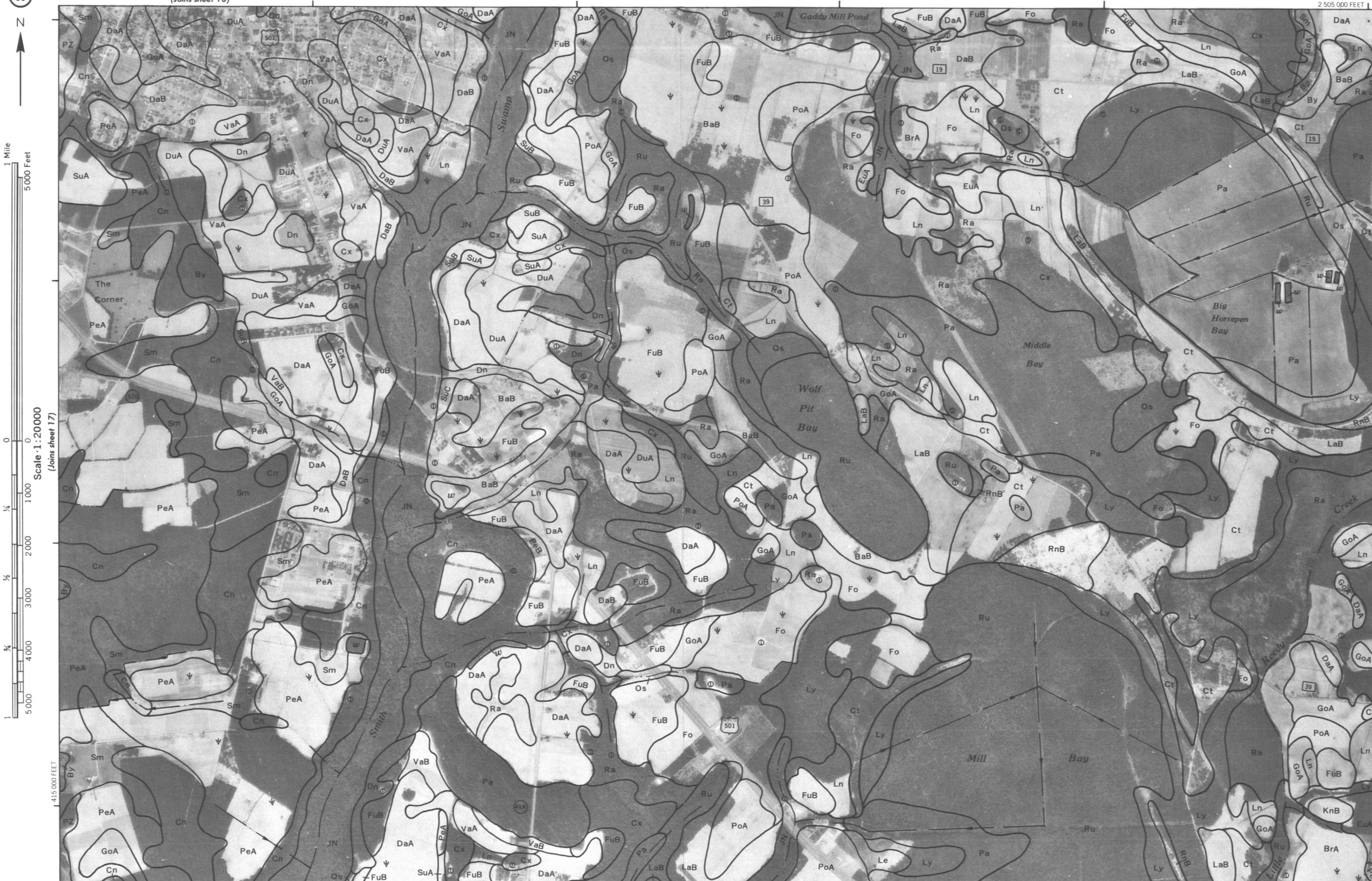
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 16

MARION COUNTY, SOUTH CAROLINA NO. 17

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

(Joins sheet 13)



(Joins sheet 23)

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 18

19

2 505 000 FEET

(Joins sheet 14)

(Joins sheet 24)

2 530 000 FEET

N

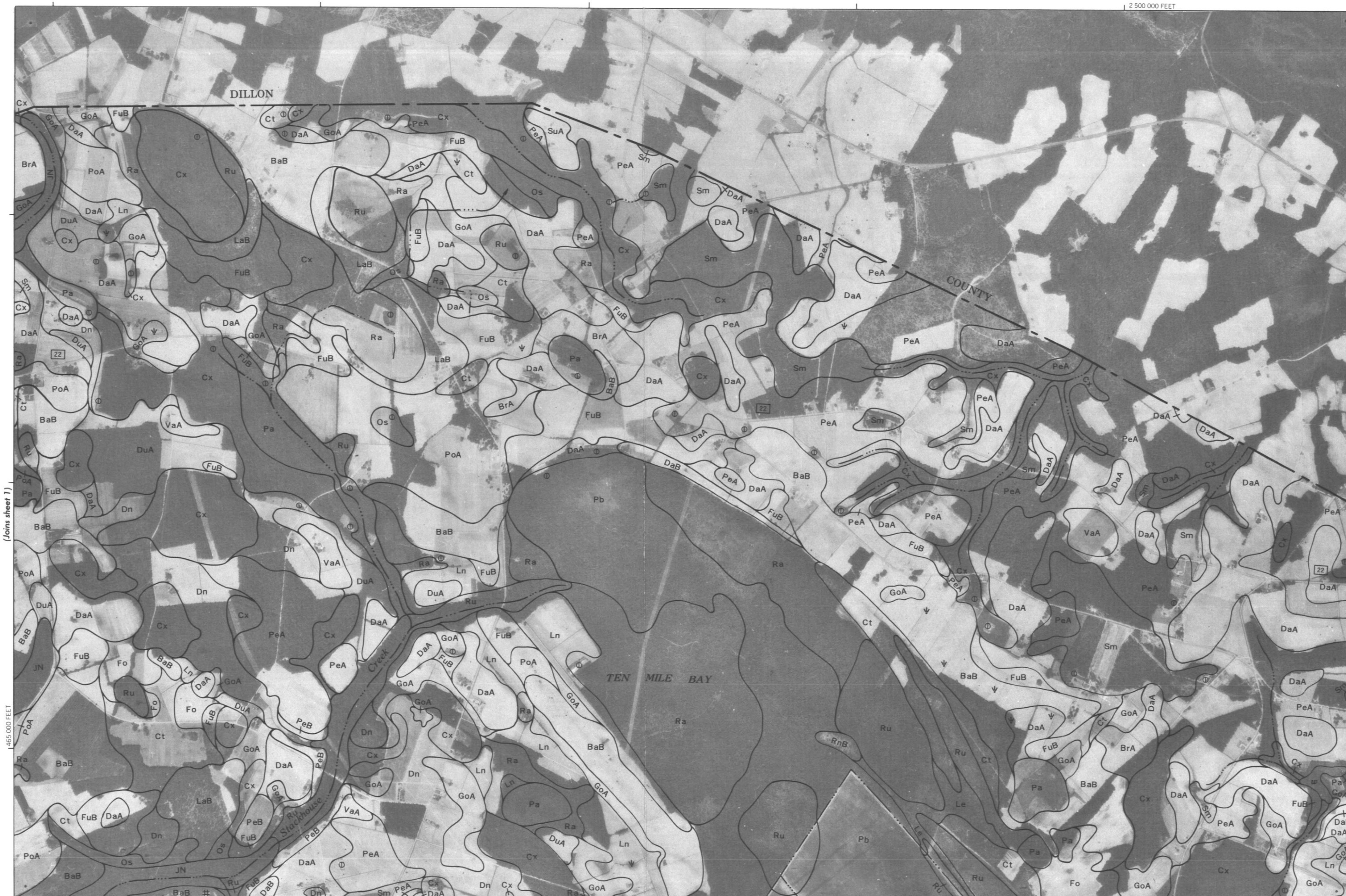
1 Mile
5000 Feet
Scale 1:20000

MARION COUNTY, SOUTH CAROLINA NO. 19

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

2

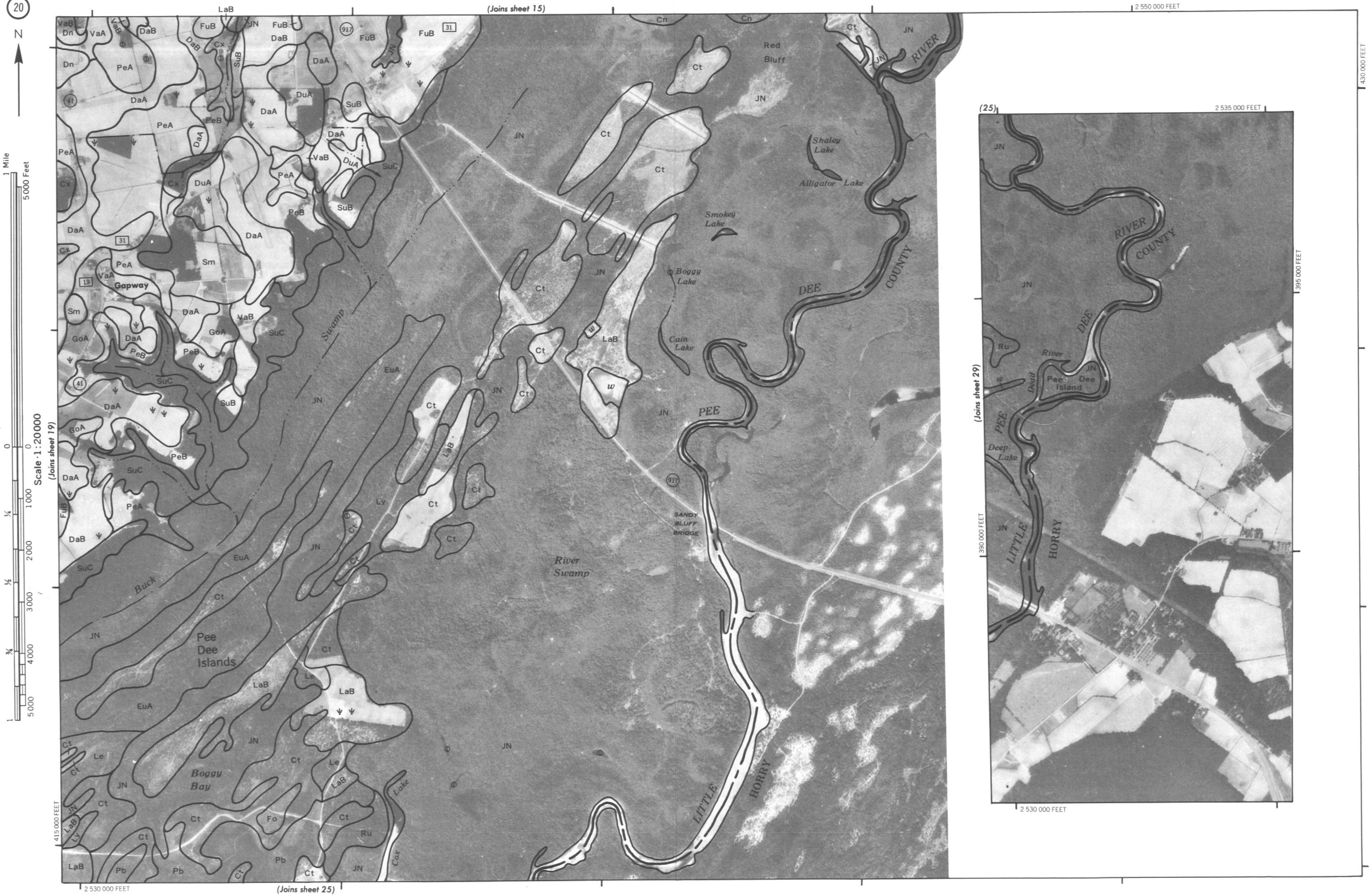
N



1 Mile
5000 Feet
Scale 1:20000
0
¼
½
¾
1
0
1000
2000
3000
4000
5000

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

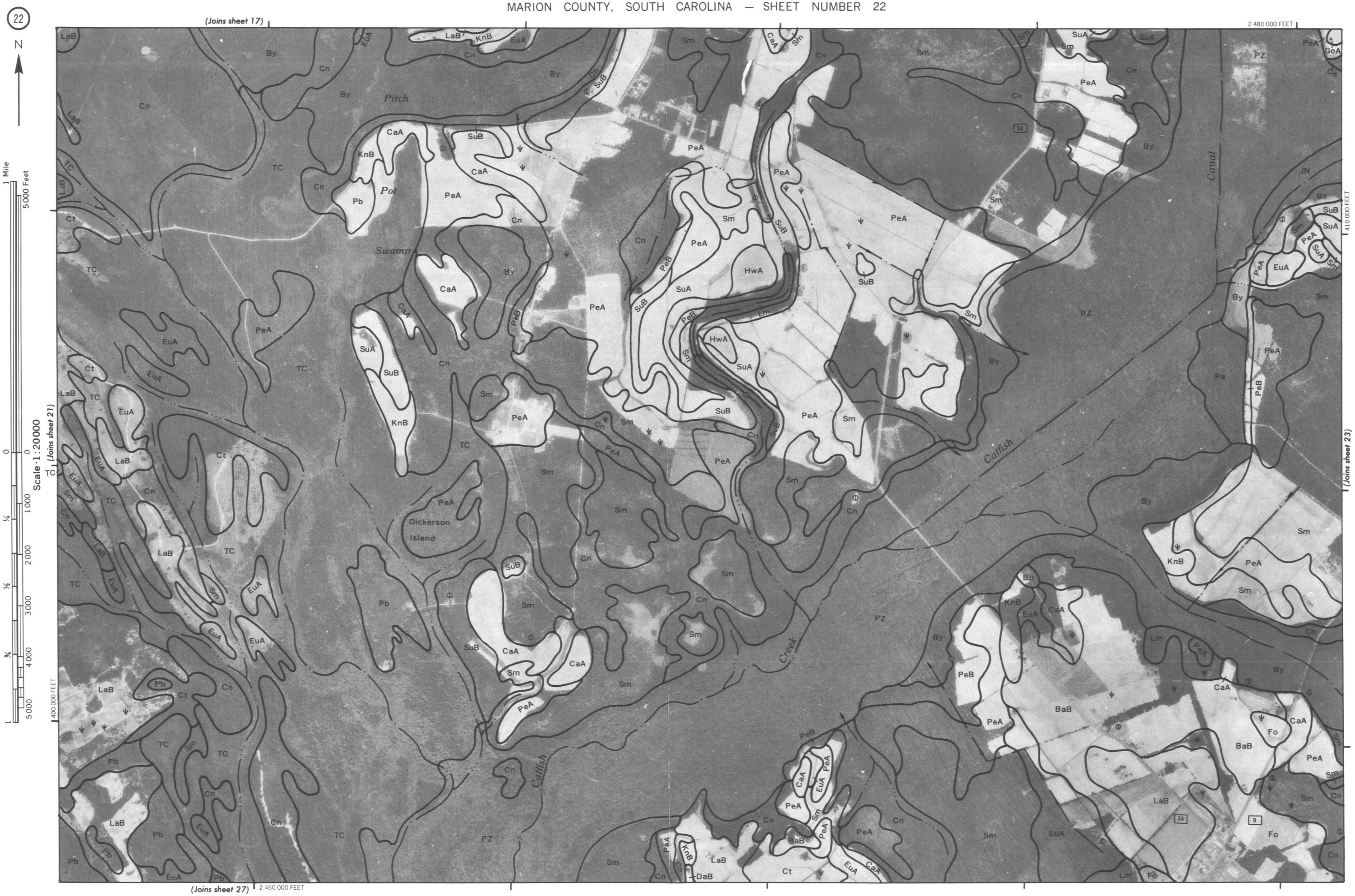
MARION COUNTY, SOUTH CAROLINA NO. 2



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 21

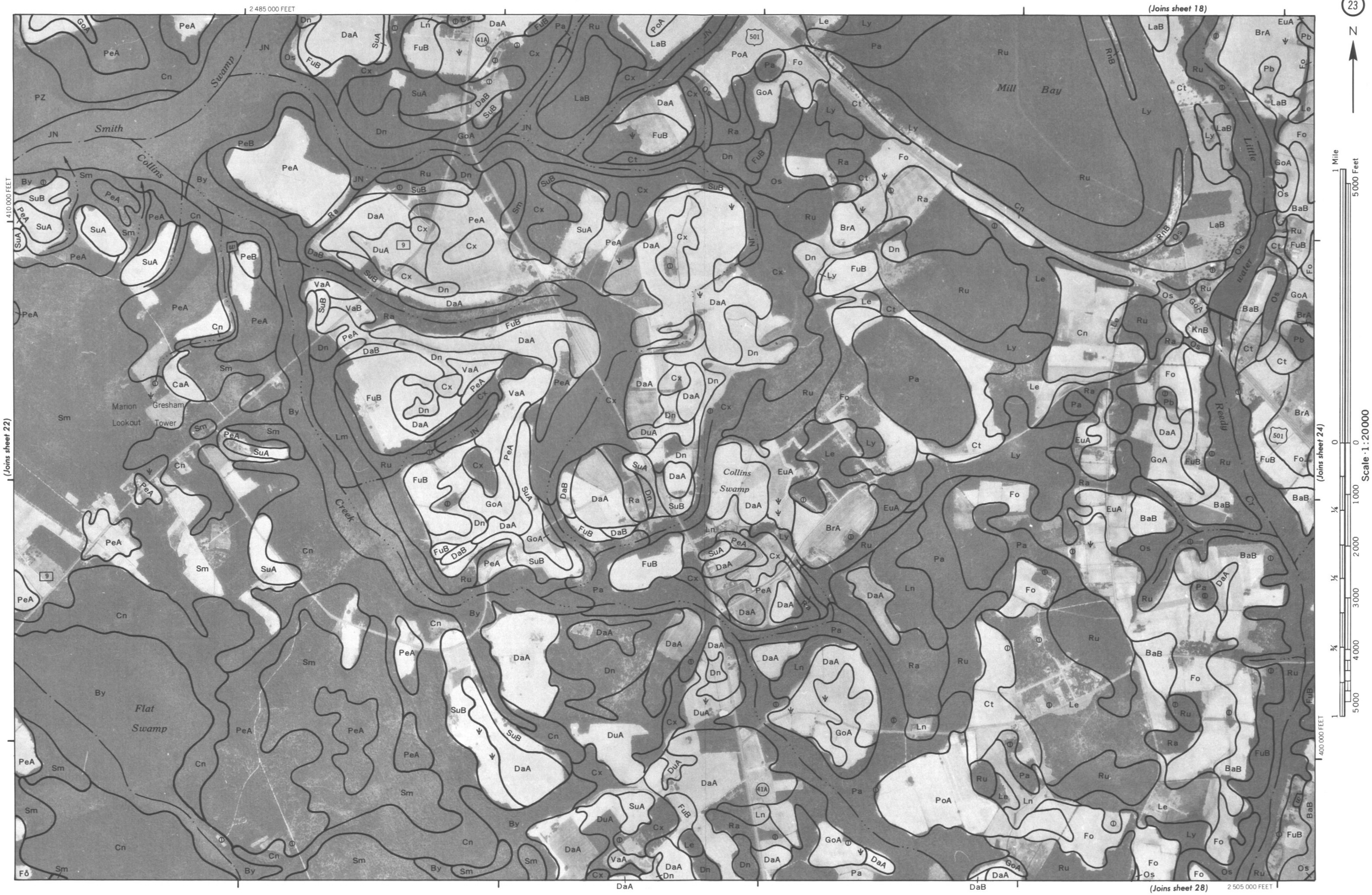
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 22

23



MARION COUNTY, SOUTH CAROLINA NO. 23

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA — SHEET NUMBER 24

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 24

MARION COUNTY, SOUTH CAROLINA NO. 25

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

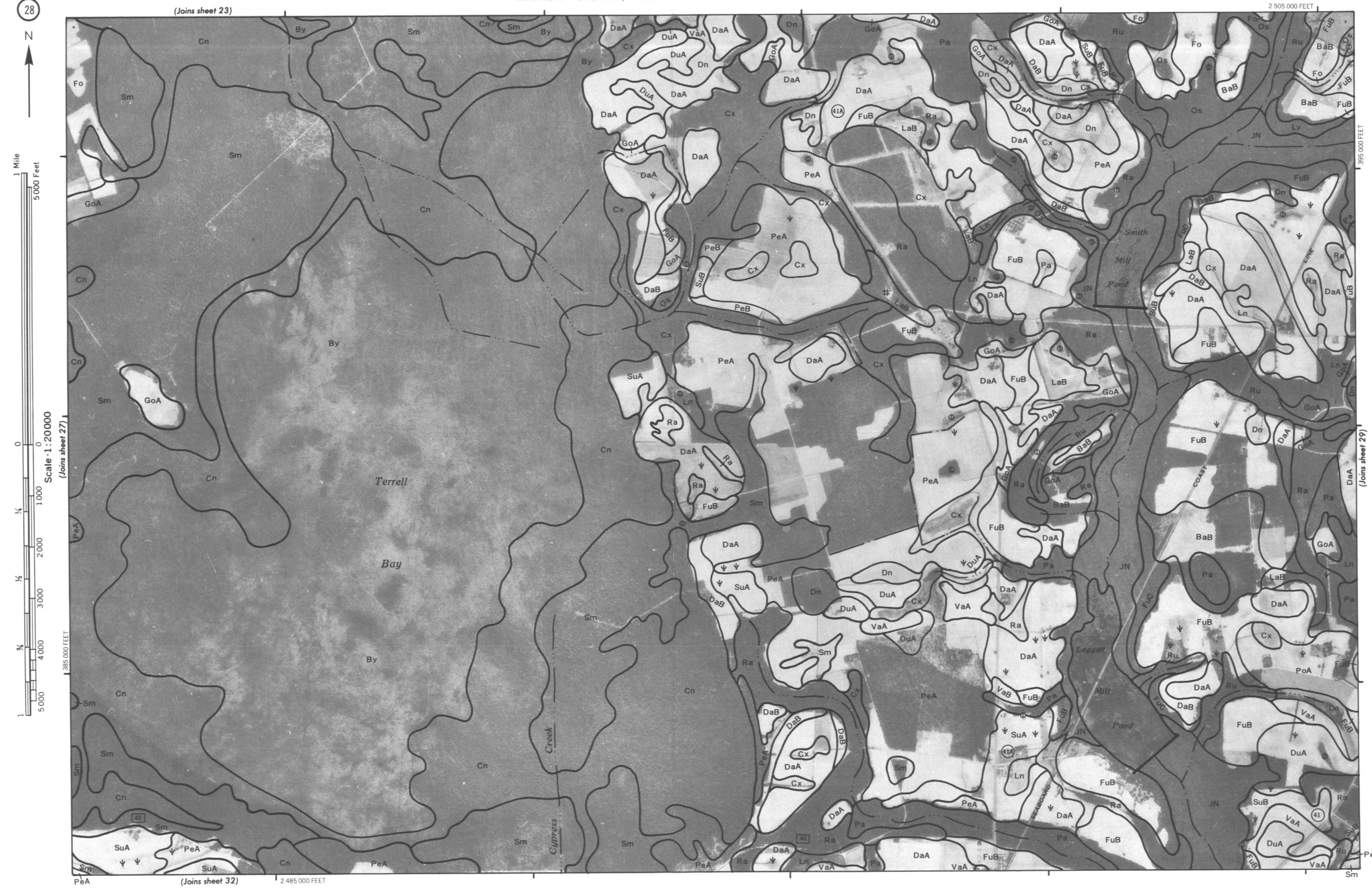
MARION COUNTY, SOUTH CAROLINA — SHEET NUMBER 26

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 26

MARION COUNTY, SOUTH CAROLINA NO. 27

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 28

29

(Joins sheet 24)

(Joins inset, sheet 20)

(Joins sheet 28)

(Joins sheet 33)

N

1 Mile

5000 Feet

0

Scale 1:20000

¼ ½ ¾ 1

1000 2000 3000 4000 5000

MARION COUNTY, SOUTH CAROLINA NO. 29

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 3

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

30

N

Scale 1:20000

1 Mile · 5 000 Feet · 0 · 1000 · 2000 · 3000 · 4000 · 5000 · ¼ · ½ · ¾ · 1

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 30

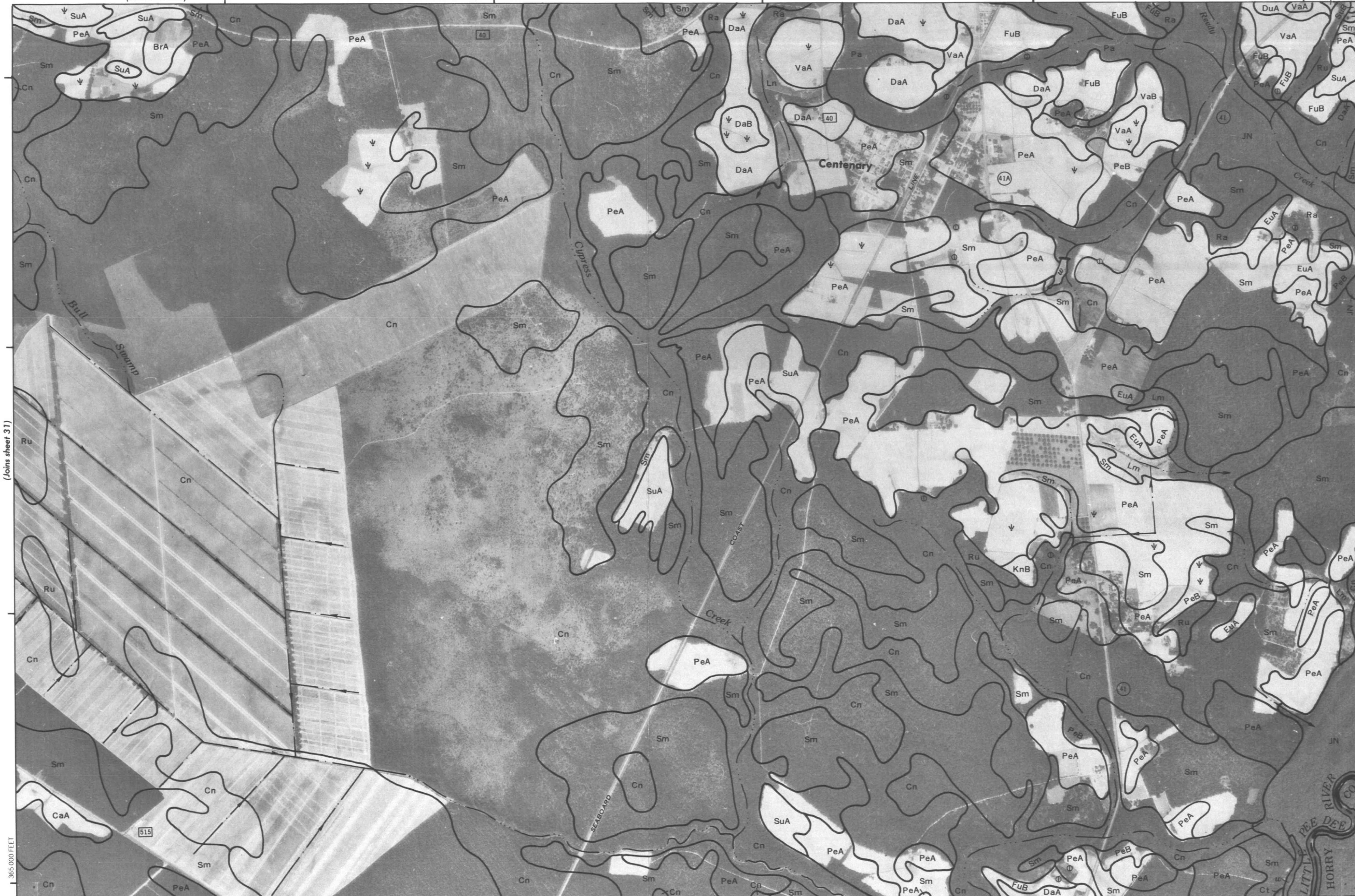
MARION COUNTY, SOUTH CAROLINA NO. 31

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

32

N

(Joins sheet 28)



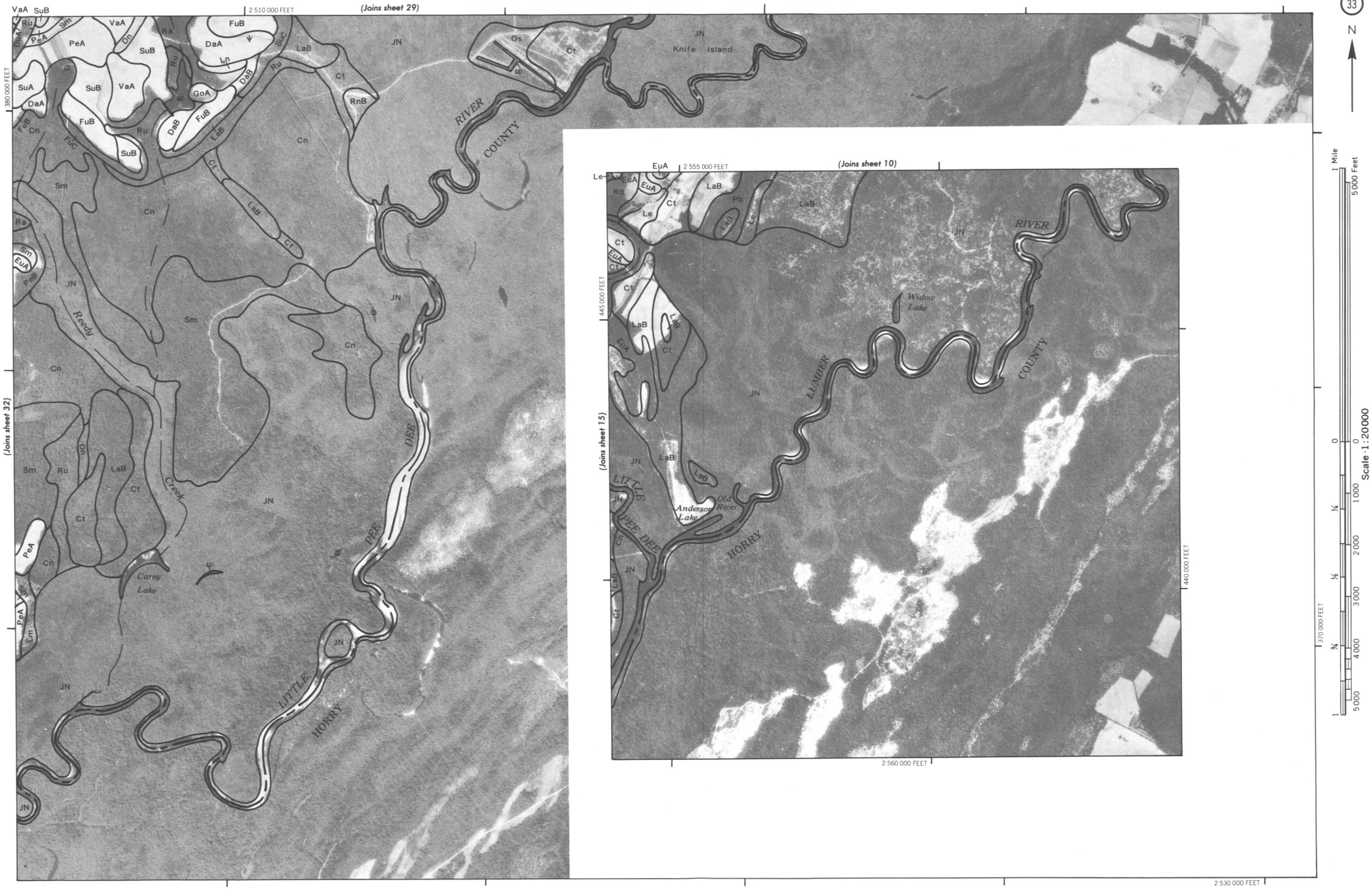
(Joins sheet 31)

(Joins sheet 33)

(Joins sheet 35)

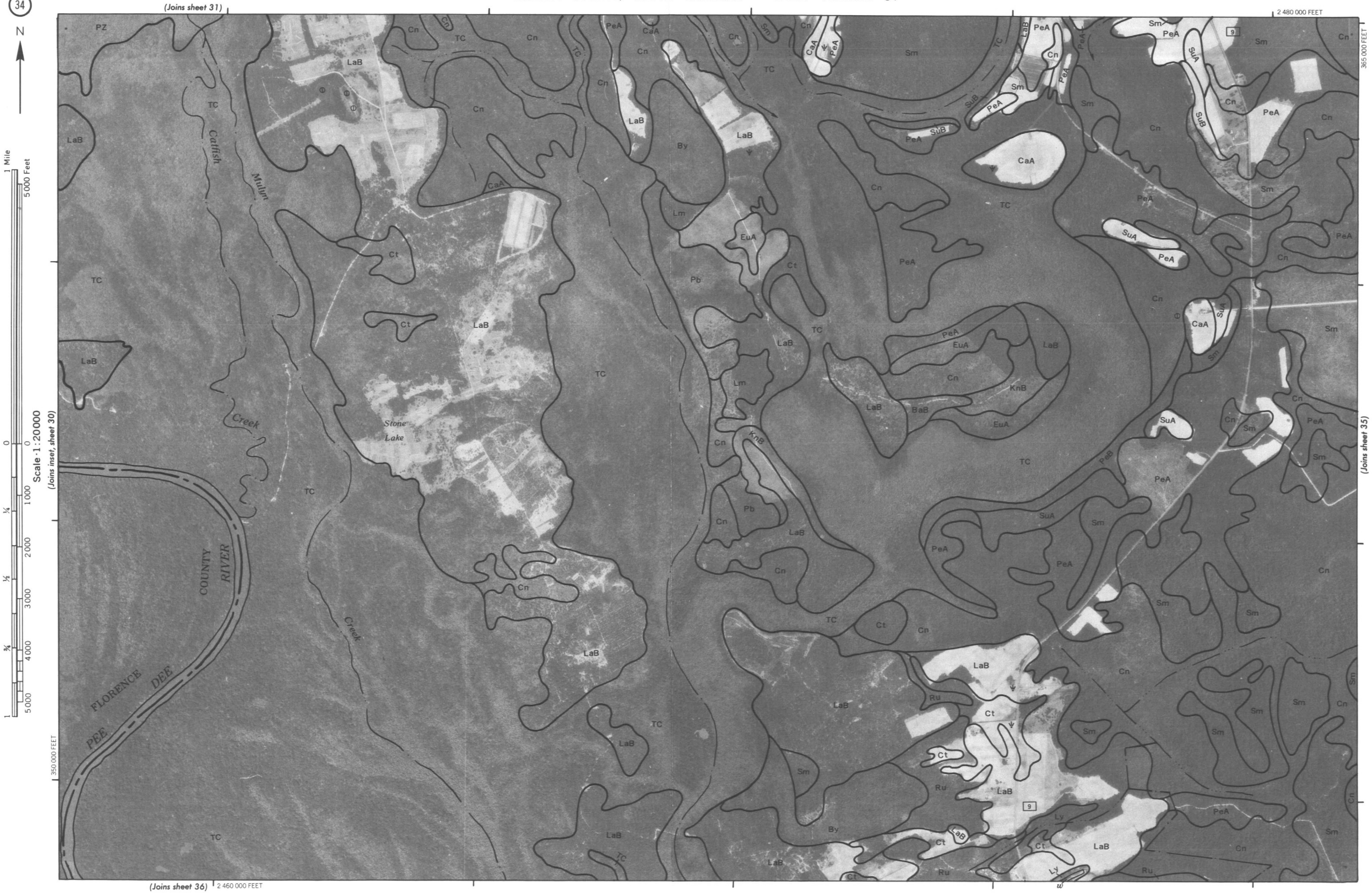
1 Mile
5000 Feet
Scale 1:20000
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



MARION COUNTY, SOUTH CAROLINA NO. 33

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 35

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

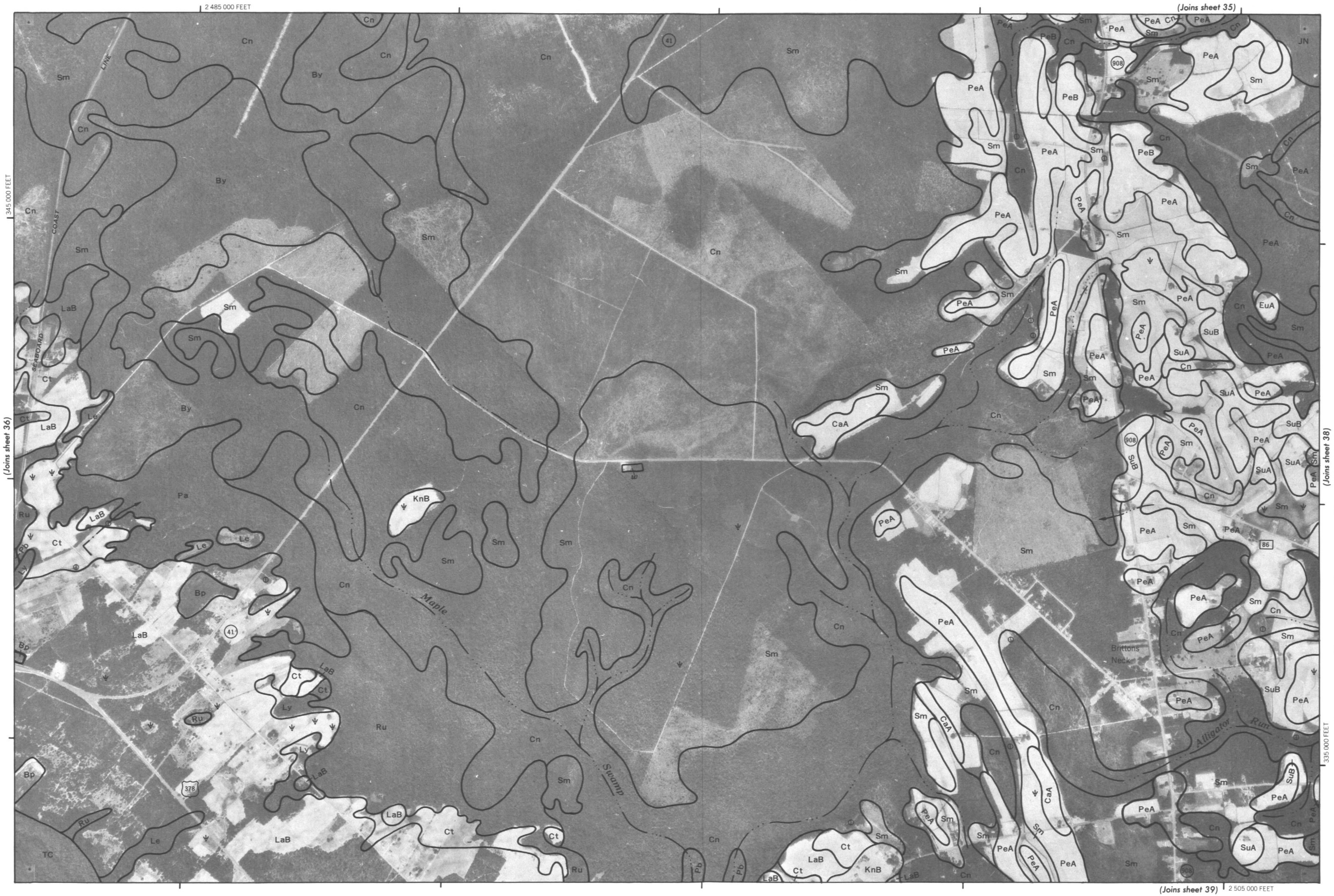
This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 36

37

MARION COUNTY, SOUTH CAROLINA NO. 37

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

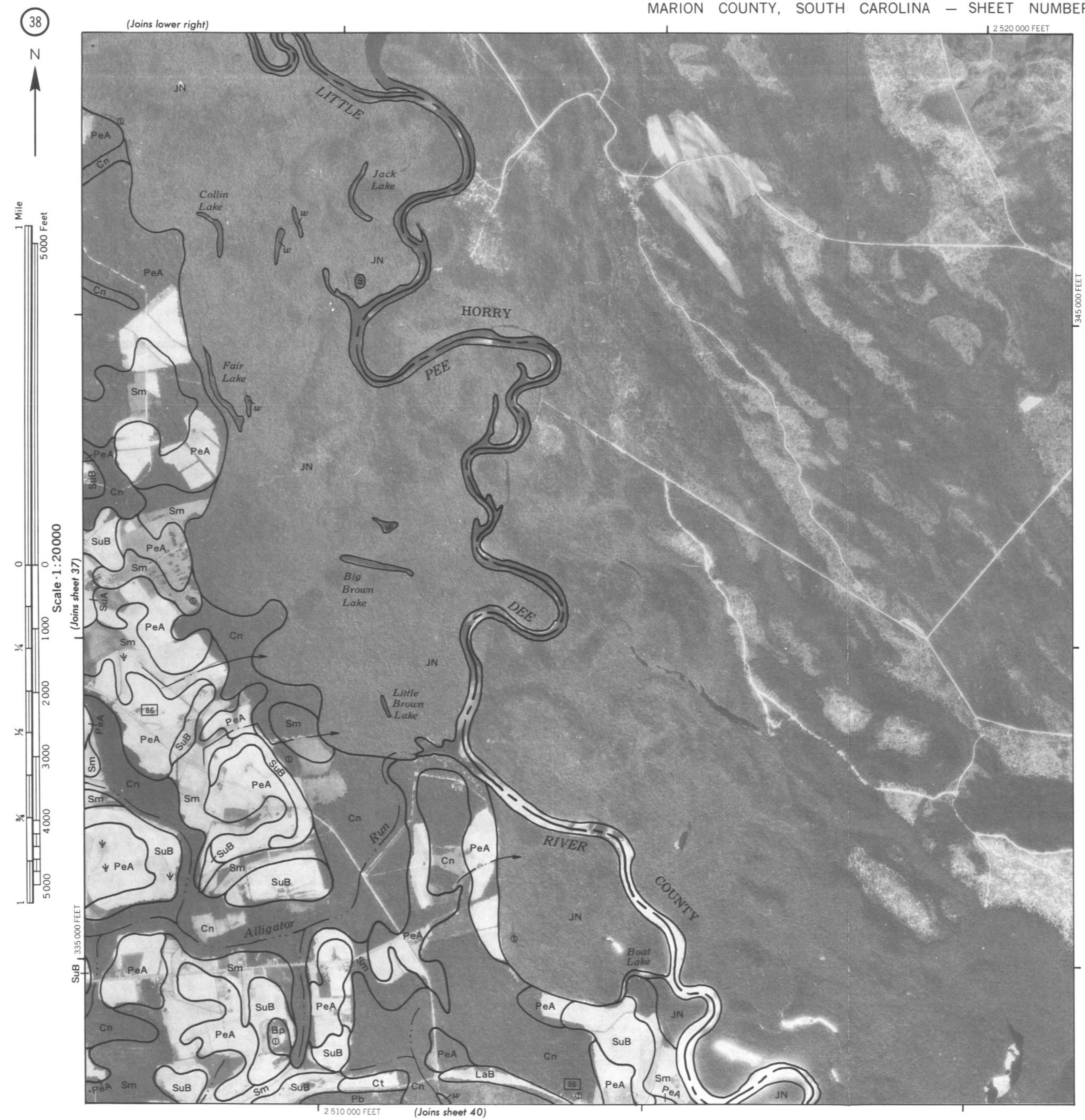


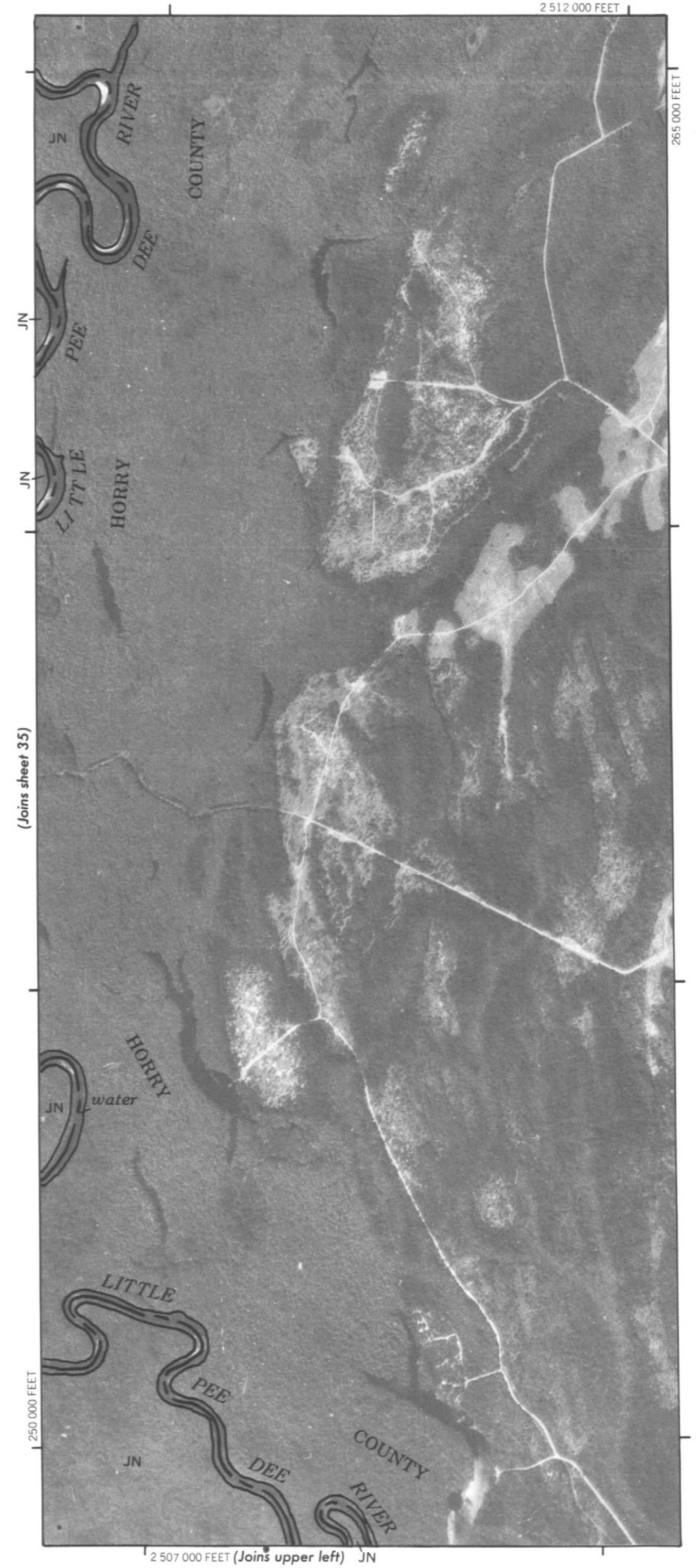
N

Scale 1:20000

1 Mile ¾ ½ ¼ 0

5000 Feet 4000 3000 2000 1000 0 5000





This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 38

2 485 000 FEET

(Joins sheet 37)

(Joins inset, sheet 36)

330 000 FEET

(Joins sheet 40)

320 000 FEET

(Joins sheet 41)

2 505 000 FEET

N

1 Mile

5000 Feet

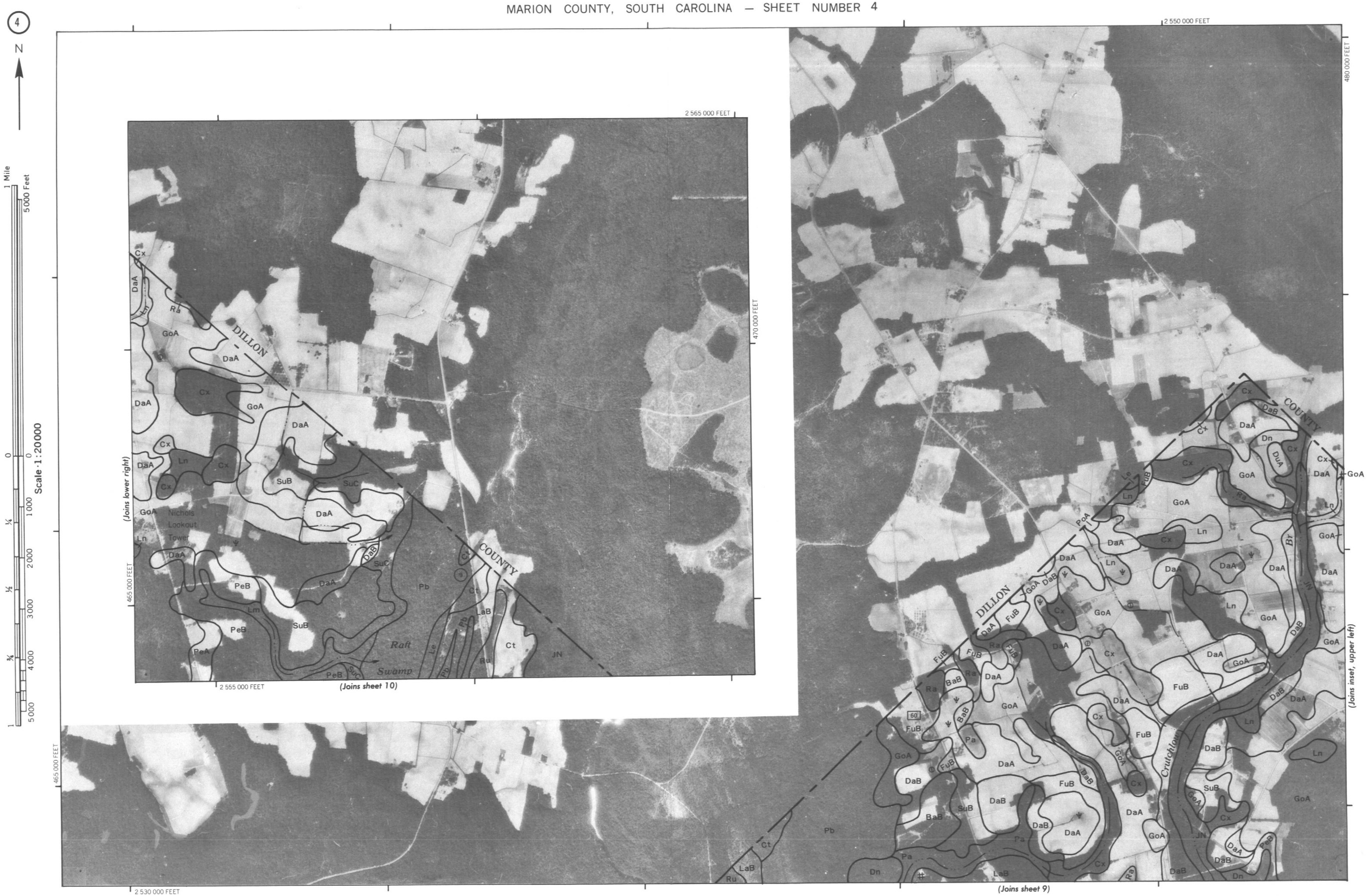
Scale 1:20000

0 ¼ ½ ¾ 1

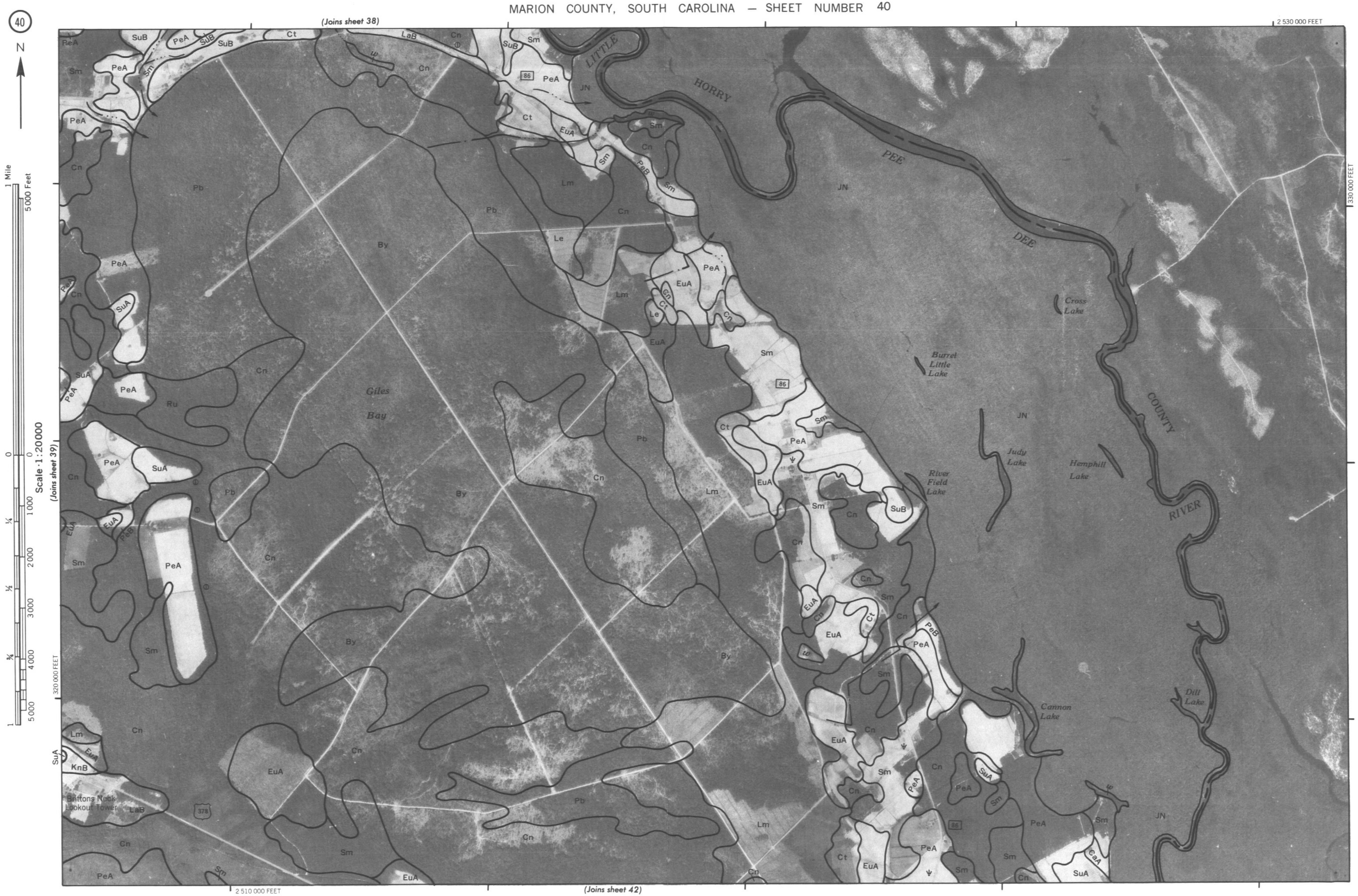
0 1000 2000 3000 4000 5000

MARION COUNTY, SOUTH CAROLINA NO. 39

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

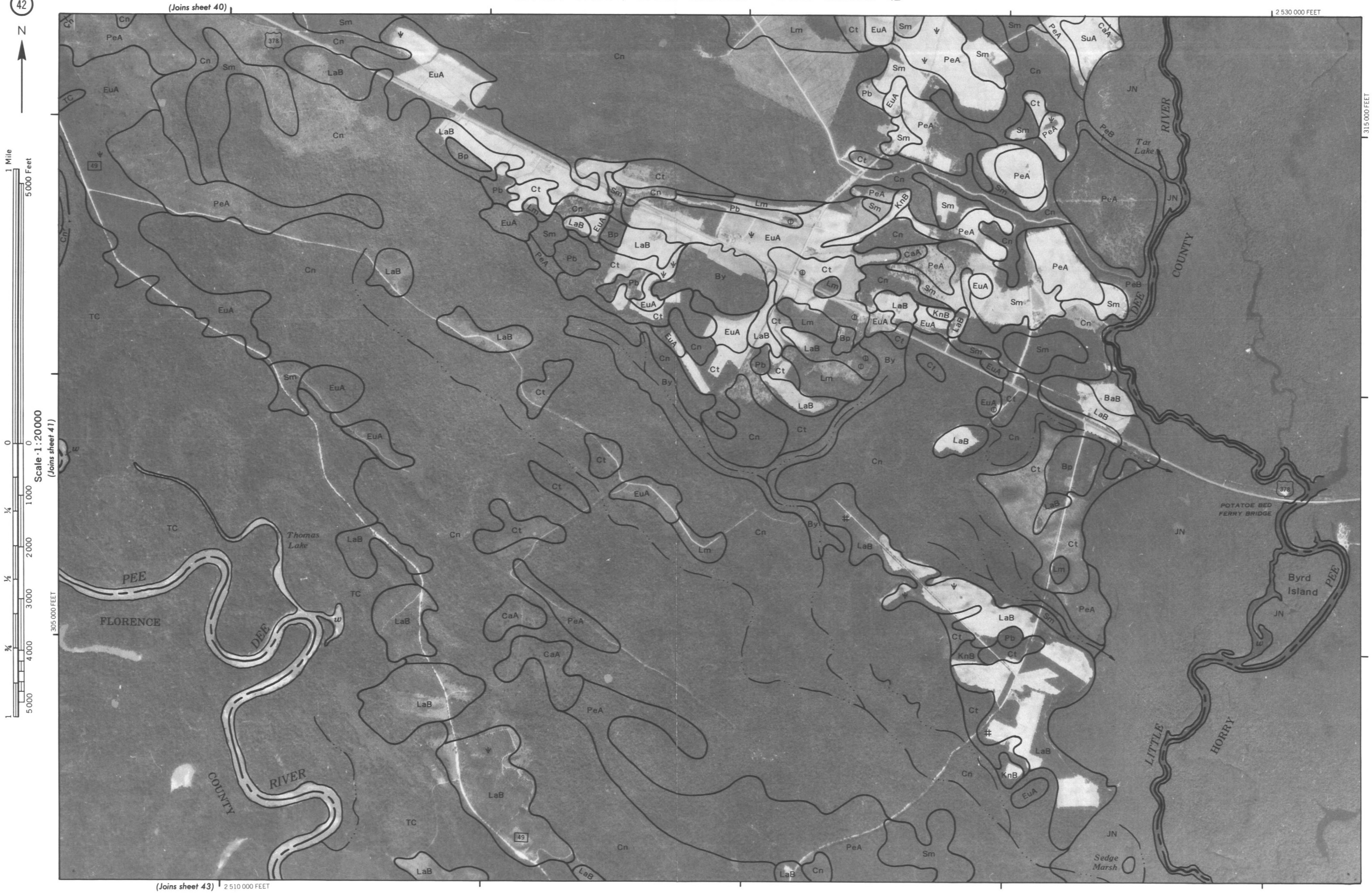


This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 40

MARION COUNTY, SOUTH CAROLINA NO. 41

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U.S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 43

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

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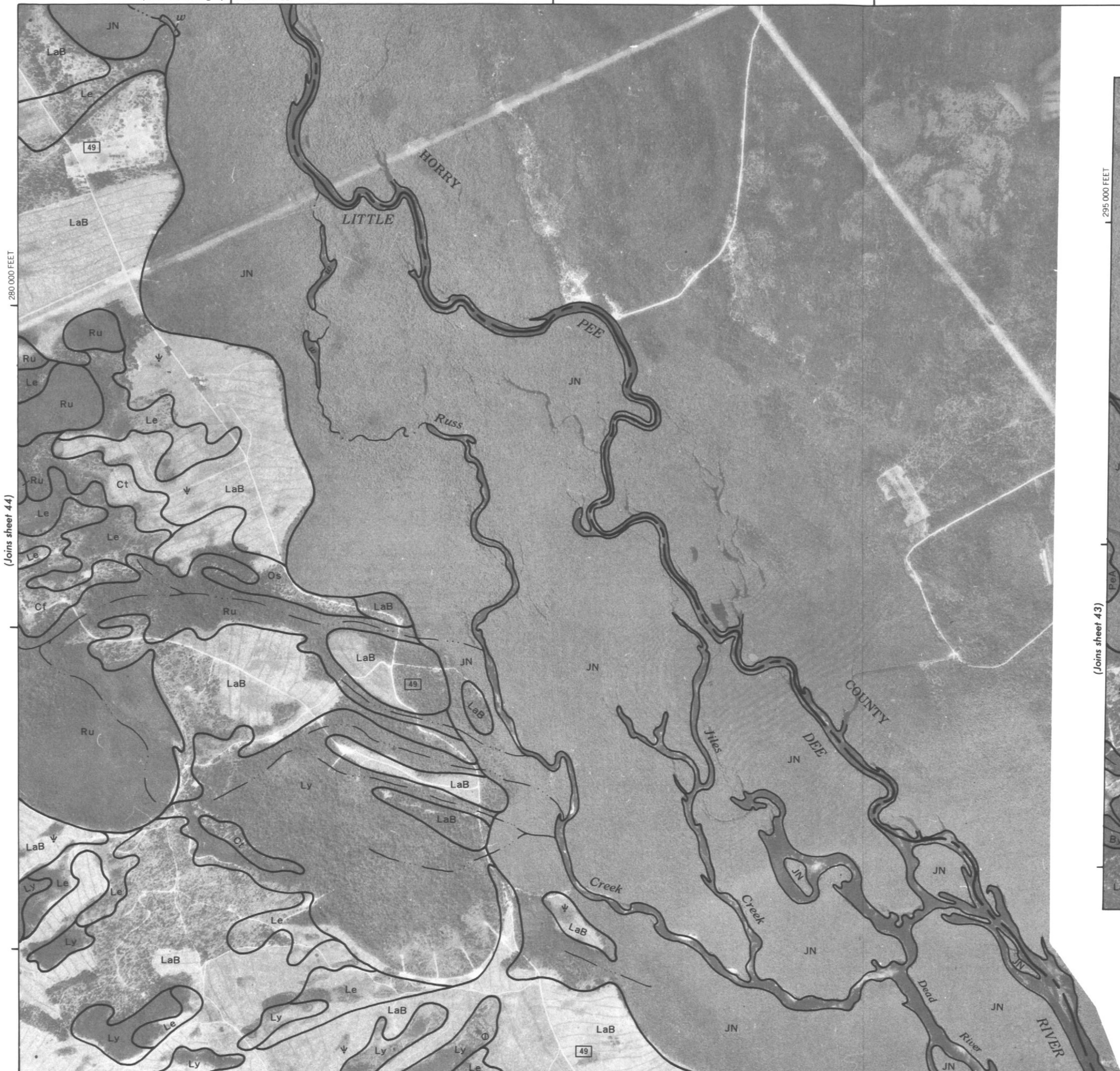
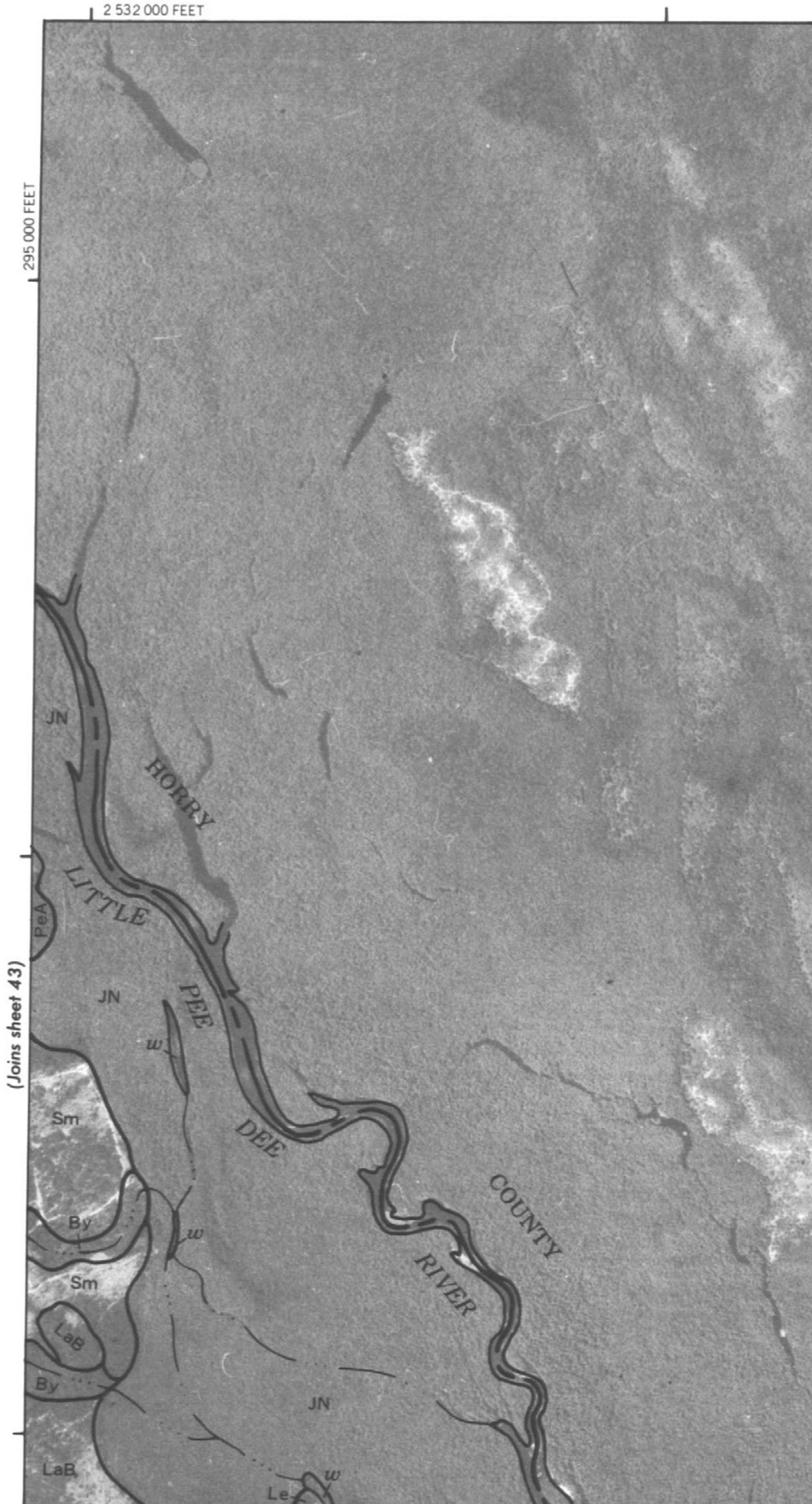
MARION COUNTY, SOUTH CAROLINA NO. 44





N

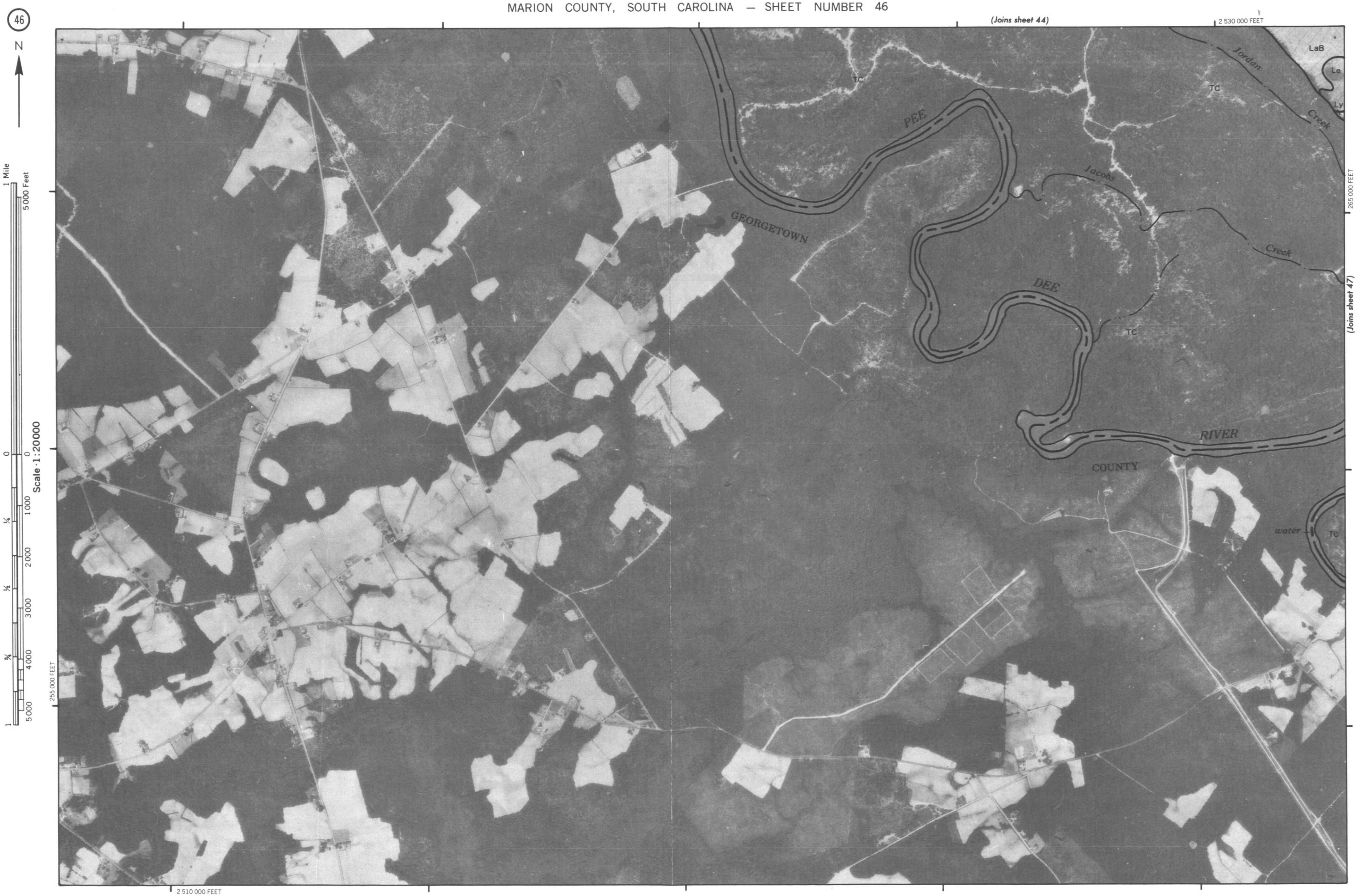
1 Mile
5 000 Feet
Scale 1:20000

270 000 FEET

2 555 000 FEET

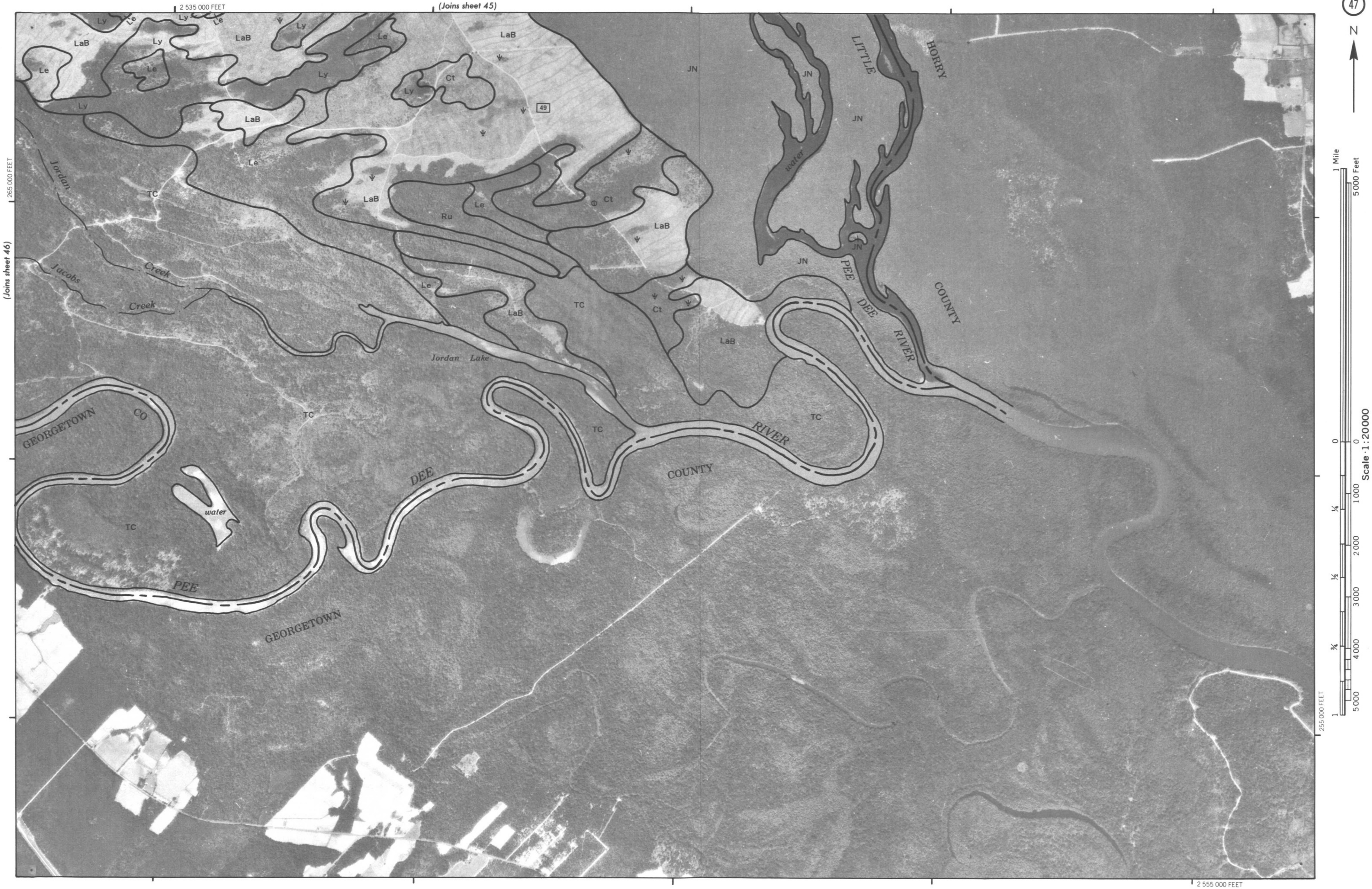
MARION COUNTY, SOUTH CAROLINA NO. 45

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies.
Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 46

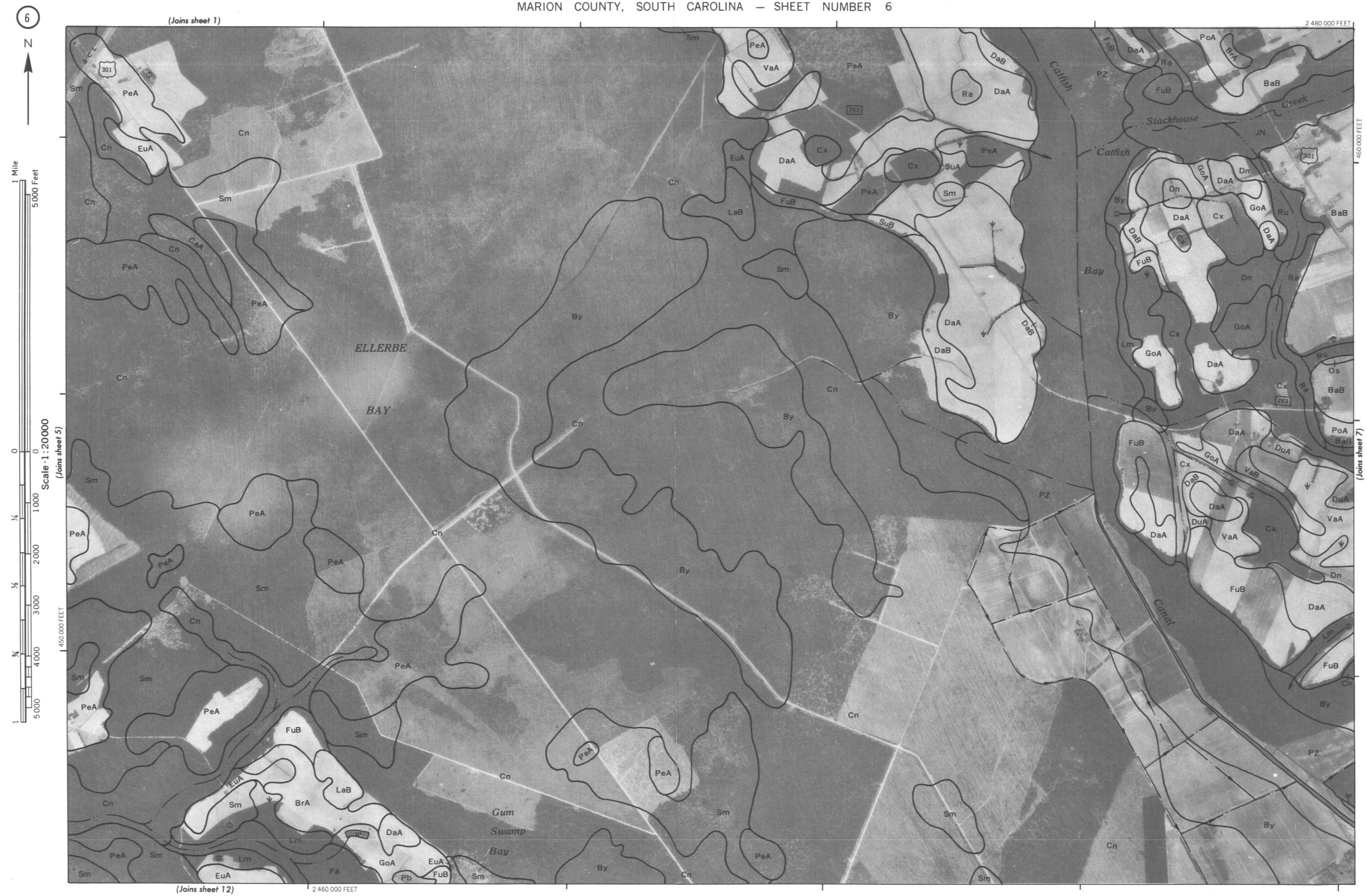


MARION COUNTY, SOUTH CAROLINA NO. 47

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 5

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

MARION COUNTY, SOUTH CAROLINA NO. 6

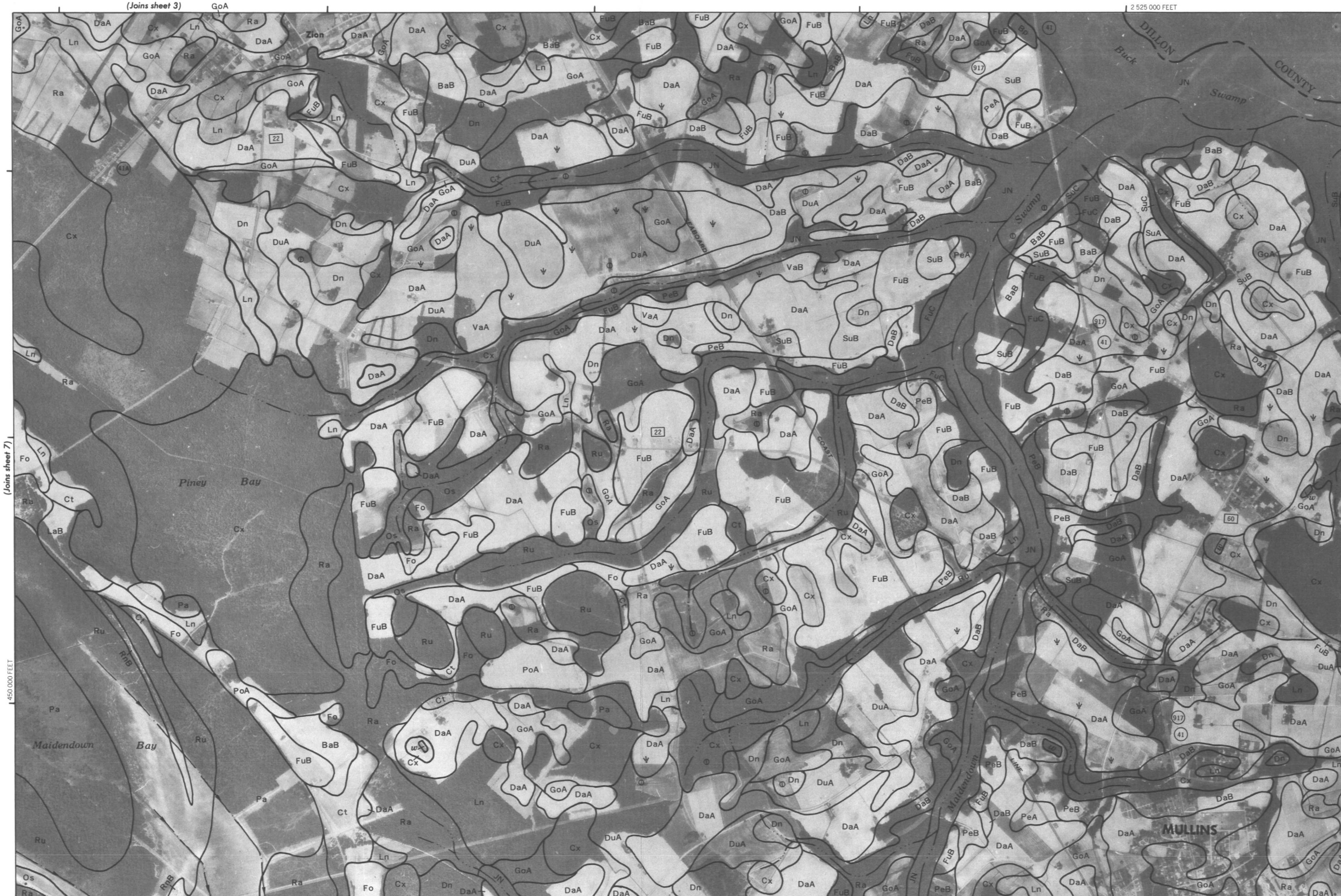
MARION COUNTY, SOUTH CAROLINA NO. 7

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

8

N

(Joins sheet 3)



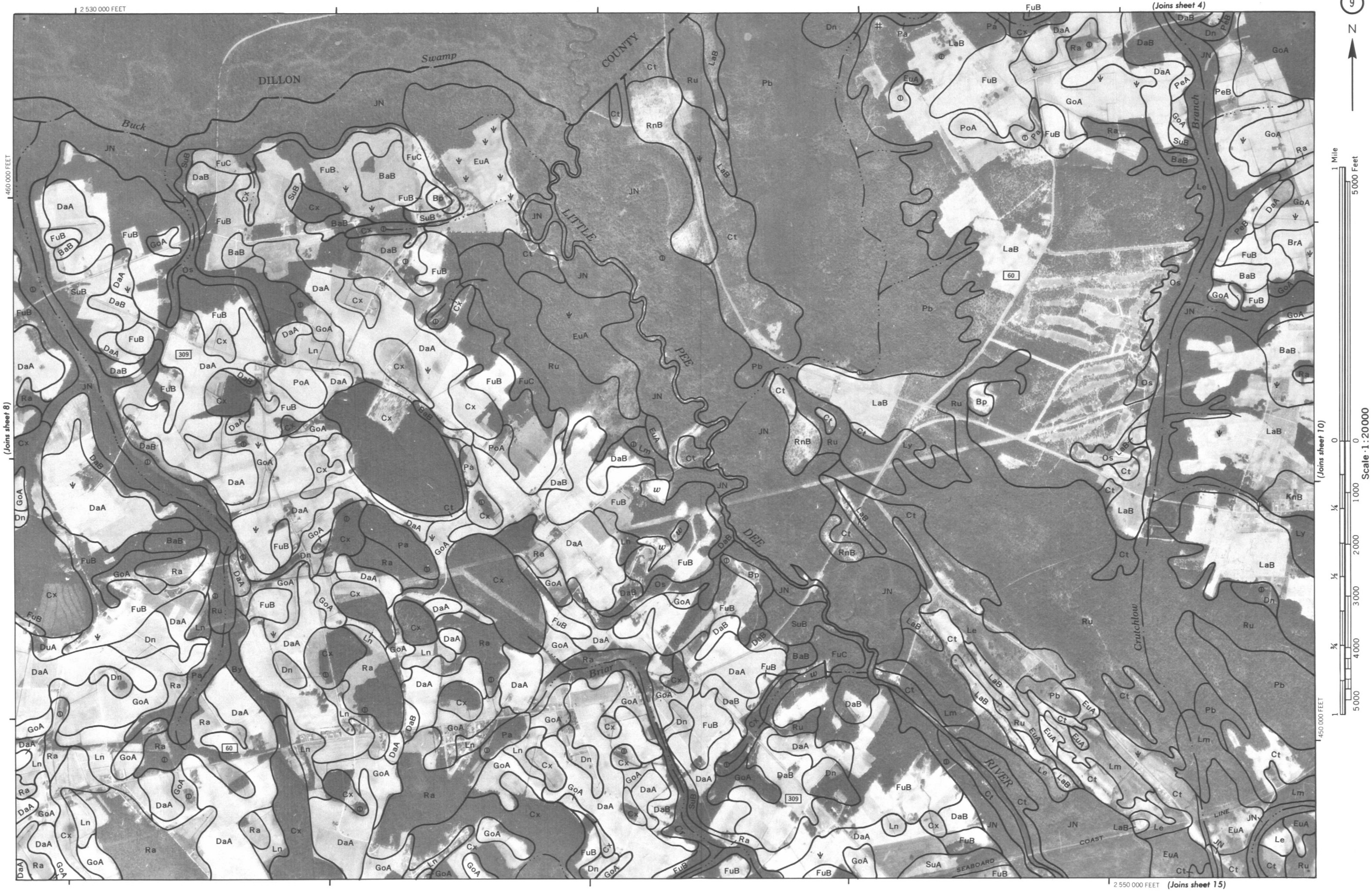
(Joins sheet 7)

(Joins sheet 9)

(Joins sheet 14)

1 Mile
5000 Feet
Scale 1:20000
0 ¼ ½ ¾ 1
0 1000 2000 3000 4000 5000

This map is compiled on 1976 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



MARION COUNTY, SOUTH CAROLINA NO. 9

This map is compiled on 1975 aerial photography by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Coordinate grid ticks and land division corners, if shown, are approximately positioned.